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# TRANSCRIPT OF RECORD.

## SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, ~~1901.~~ 1902.

No. ~~389~~ 149.

JOHN D. HOOKER AND A. E. POMEROY, PLAINTIFFS IN ERROR,

*vs.*

THE CITY OF LOS ANGELES.

ERROR TO THE SUPREME COURT OF THE STATE OF CALIFORNIA.

FILED AUGUST 8, 1901.

(18,243.)

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aa *Writ of Error.*

UNITED STATES OF AMERICA, *ss:*

The President of the United States to the honorable the justices of the supreme court of the State of California, Greeting:

Because in the records and proceedings, as also in the rendition of the judgment of a plea which is in the said supreme court of the State of California before you or some of you, being the highest court of law or equity of the said State, in which a decision could be had in that certain suit between John D. Hooker and A. E. Pomeroy, defendants and plaintiffs in error, and The City of Los Angeles, the plaintiff and defendant in error, wherein was drawn in question the validity of statutes of the State of California on the ground of their being repugnant to the Constitution and treaties and laws of the United States, and the decision was in favor of the validity of such statutes, and wherein was drawn in question the construction of a clause of the Constitution of the United States and of a treaty of the United States, and the decision was against the right, title, privilege or exemption specially set up or claimed under such clause of the said Constitution and treaty, a manifest error hath happened to the great damage of said John D. Hooker and A. E. Pomeroy, the plaintiffs in error, as by their complaint appears, we being willing that the error, if any hath been, should be duly corrected, and full and speedy justice done to the parties aforesaid in this behalf, do command you, if judgment be therein given, that then under your seal, distinctly and openly, you send the record and proceedings aforesaid, with all things concerning the same to the Supreme Court of the United States, together with this writ, so that
bb you may have the same at Washington on the 26th day of August A. D. 1901, next in the said Supreme Court, to be then and there held, that the record and proceedings aforesaid being inspected, the said Supreme Court may cause further to be done therein to correct that error what of right, and according to the laws and customs of the United States should be done.

Witness the Honorable Melville W. Fuller, Chief Justice of the Supreme Court of the United States the 27th day of June, 1901.

[Seal U. S. Circuit Court, Northern Dist. Cal.]

SOUTHARD HOFFMAN,
*Clerk of the Circuit Court of the United States in and for the Northern Circuit and Northern District of California.*

Allowed by
W. H. BEATTY,
*Chief Justice of the Supreme Court of the State of California.*

I hereby certify that a copy of the foregoing writ of error was on the 27th day of June, 1901, lodged in the clerk's office of the said

supreme court of the State of California for the said defendant in error.

GEO. W. ROOT,
*Clerk of the Supreme Court of the State of California,*
By A. W. JOHNSON,
*Chief Deputy.*

*cc* [Endorsed:] Original. L. A. 419. In the supreme court of the State of California. City of Los Angeles, *v.* John D. Hooker, *et al.* Writ of error. Filed Jun- 27, 1901. Geo. W. Root, clerk. By A. W. Johnson, chief deputy. Garber, Creswell & Garber, attorneys-at-law, 305 Sansome street, San Francisco, Cal.

*dd* Los Angeles, No. 419.

In the Supreme Court of the State of California.

THE CITY OF LOS ANGELES, Plaintiff and Respondent,
*vs.*
A. E. POMEROY and J. D. HOOKER, Defendants and Appellants.

From the superior court of Los Angeles county—Lucien Shaw, judge.

*Transcript on Appeal.*

John S. Chapman, R. H. F. Variel, John G. North, attorneys for def'ts and app's.
Wm. E. Dunn and Lee & Scott, att'ys for plaintiff and resp.

Filed June 28th, 1897.

T. H. WARD, *Clerk,*
By F. C. WOODBURY, *Deputy.*

*a* *General Index.*


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All in portfolio made part of transcript.

*Plaintiff's Exhibits.*

Map A 1, of Providencia and Scott tract.
Map No. 12, showing location of old dams and ditches.
Map No. 13, showing drainage area of Los Angeles river.
Map No. 14, showing plan of headworks and land to be condemned.
Map No. 15, profile showing geological formation.
Map No. 16, profile showing geological formation.
Map No. 17, profile showing geological formation.
Map No. 18, profile showing plane of saturation.
Map No. 19, profile showing plane of saturation.
Map No. 20, profile on lines C–D.
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Map No. 26, narrows of Los Angeles river.

*Defendants' Exhibits.*

Map, Exhibit B, profile of borings, January, 1893.
Map, Exhibit C, profile of borings on Providencia rancho.
Map, Exhibit D, plat of land to be condemned.
Map, Exhibit F, Pomeroy and Hooker water-bearing lands.
Map, Exhibit G, contour San Fernando watershed.
Map, Exhibit H, profile on lines C–C.
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Map, Exhibit S, profile on lines R–R.
Map, Exhibit T, profile of outlet of San Fernando valley.
Map, Exhibit K–K, printed map Providencia rancho.

1 In the Superior Court of the County of Los Angeles, State of California.

THE CITY OF LOS ANGELES (a Municipal Corporation), Plaintiff,
*vs.*
A. E. POMEROY and J. D. HOOKER, Defendants.

*Complaint.*

Now comes the plaintiff, a municipal corporation organized and existing under the laws of the State of California, and for cause of action says:

I.

That the City of Los Angeles is the owner of all the waters of the Los Angeles river, including all of its sources, springs, underground flow and percolating waters.

That the City of Los Angeles is constructing a system of water works to be owned and controlled by the city. Such system
2 is so designed as to take the waters of the Los Angeles river and distribute the same to the inhabitants of said city.

That in order to get the proper elevation, as well as to reach the best and purest supply of water from said river, it is necessary to go about 6 or 7 miles above said city's limits at a point situated upon the land hereinafter described, at which said point said city has designed a system of headworks.

II.

That the public interest and necessity of the City of Los Angeles demands the construction of said system of water works, and that in order to properly construct and maintain the same, and secure the necessary land for pipes, flumes and conduits, and to construct the necessary collecting chambers, tunnels and filtration galleries, and for the consrtuction and operation of said headworks, that it is necessary that the following-described real estate, owned by the defendants, should be condemned and acquired for the use of said city.

III.

Said lands are situate in the county of Los Angeles, State of California, more particularly described as follows, to wit:

First tract. Beginning at station No. 22 of the Los Feliz Rancho

Patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 15 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said rancho boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision, as shown on plat of same, recorded in Book No. 17, pages 15 and
3 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65, to a stake on the south side of Los Angeles river, from which point a blazed live-oak tree, 30 inches in diameter, bears N. 73 deg. E. 73 links distant; also a second blazed live-oak tree, 26 inches in diameter, bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 81 deg. 24 min. E. 26.65 chains; thence N. 54 deg. .02 min. E. 27.90 chains to the place of beginning; containing 288.42 acres, more or less, the same being a portion of the Providencia Park tract.

Second tract. Beginning at the southwest corner of block 65 of the subdivision of the Providencia subdivision; thence northerly along the westerly line of said block N. 22 deg. 25 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence south 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning, containing 26.40 acres, more or less, the same being part of lot 65 of the Providencia and Scott tract.

4 Reference is also made to the plat hereto attached, for a description of said two tracts.

IV.

The said J. D. Hooker is the owner of the first-described tract of land, and the said A. E. Pomeroy is the owner of the second-described tract.

Wherefore, plaintiff prays judgment against the defendants and each of them for the condemnation of each of said tracts of lands hereinbefore described, for the purpose of maintaining and operating said headworks, and that the damages to the defendants and each of them by reason of the taking of said property may be esti-

mated, and for such other orders, judgments and decrees as may be necessary and proper in the premises.

C. McFARLAND,
*Attorney for Plaintiff.*

STATE OF CALIFORNIA, } ss:
*County of Los Angeles,* }

C. McFarland, being duly sworn, says: That the plaintiff is a municipal corporation organized and existing under the laws of the State of California; that he is an officer of said corporation, to wit, the city attorney; that he has read the foregoing complaint and knows the contents thereof and that the same is true of his own knowledge, except as to such matters as are therein stated upon information or belief, and that as to such he believes it to be true.

C. M'FARLAND.

Subscribed and sworn to before me this 22d day of May, 1893.

[SEAL.] W. E. DUNN.
*Notary Public, Los Angeles County, California.*

Endorsed: Filed June 8, 1893. T. H. Ward, clerk; by A. W. Seaver, deputy.

(Title of Court and Cause.)

*Summons.*

5 The People of the State of California send greeting to A. E. Pomeroy and J. D. Hooker, defendants:

You are hereby required to appear in an action brought against you by the above-named plaintiff in the superior court of the State of California, in and for Los Angeles county, and to answer the complaint filed therein, within ten days (exclusive of the day of service,) after the service on you of this summons, if served within this county, or, if served elsewhere, within thirty days, or judgment by default will be taken against you according to the prayer of said complaint.

The said action is brought to condemn the property hereinafter described for the use of the City of Los Angeles for the purpose of constructing a headworks for the system of water works, to be owned and controlled by the City of Los Angeles, which land sought to be condemned is situate in the county of Los Angeles, State of California, and is more particularly bounded and described as follows, to wit:

First tract. Beginning at station No. 22 of the Los Feliz Rancho Patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 85 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said ranch boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the

southwesterly corner of block 65 of said subdivision, as shown on plat of same, recorded in Book No. 17, pages 15 and 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence
6 S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65 to a stake on the south side of Los Angeles river, from which point a blazed live-oak tree, 30 inches in diameter, bears N. 73 deg. E. 73 links distant; also a second blazed live-oak tree, 26 inches in diameter, bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 31 deg. 24 min. E. 26.65 chains; thence N. 54 deg. .02 min. E. 27.90 chains to the place of beginning, containing 288.42 acres, more or less, the same being a portion of the Providencia Park tract.

Second tract. Beginning at the southwest corner of block 65 of the subdivision of the Providencia subdivision; thence northerly along the westerly line of said block N. 22 deg. 25 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence south 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning, containing 26.40 acres, more or less, the same being part of lot 65 of the Providencia and Scott tract. Reference being had to said complaint and the map thereto attached for a description of the respective lands sought to be condemned and the relief asked for, and for all further particulars.

You are hereby notified to appear and show cause why the property described should not be condemned as prayed for in the complaint.

7 And you are hereby notified that if you fail to appear and answer the said complaint as above required, the said plaintiff will cause your default to be entered and will apply to the court for the relief demanded in the complaint.

Given under my hand and the seal of the superior court of the State of California, in and for the county of Los Angeles, this 27 day of June in the year of our Lord one thousand eight hundred and ninety-three.

[SEAL.]

T. H. WARD, *Clerk*,
By A. W. SEAVER,
*Deputy Clerk.*

Office of the sheriff of Los Angeles county, Cal.

I hereby certify that I received the within summons on the sixth day of June, A. D. 1894, and personally served the same on the seventh day of June, 1894, on J. D. Hooker, and on the eighth day of June, 1894, on A. E. Pomeroy, being the defendants named in said summons, by delivering to each of said defendants personally, in the said county of Los Angeles, a copy of said summons, and to each of said defendants a copy of the complaint in the action named in said summons, attached to said copy of summons. Dated 9th day of June, A. D. 1894.

J. C. CLINE, *Sheriff*,
By J. A. AGUIRRE, *Deputy*.

Endorsed: Filed June 9, 1894. T. H. Ward, clerk, by F. E. Lowry, deputy.

Received June 6th, 11.55 a. m., 1894. J. C. Cline, sheriff; by J. O. Lowe, deputy.

(Title of Court and Cause.)

*Demurrer of J. D. Hooker.*

Now comes the defendant, J. D. Hooker, and not waiving
§ the motion to dismiss this action for want of prosecution filed herewith, demurs to the complaint filed herein, upon the following grounds, to wit:

I.

The said complaint does not state facts sufficient to constitute a cause of action.

II.

The said complaint is uncertain, in this:

(1.) It is uncertain as to what property the plaintiff seeks to condemn.

(2.) It is uncertain as to the purposes for which the said condemnation is sought.

(3.) It is uncertain as to the interest in the said property alleged to belong to this defendant which the plaintiff seeks to condemn.

(4.) It is uncertain as to what rights the plaintiff claims in the underground flow and percolating waters of the Los Angeles river.

(5.) It is uncertain as to what right of way is sought to be condemned, and there is no description of any right of way for pipe, flume, or conduit whatever.

(6.) It is uncertain as to what is meant by "necessary collecting chambers;" uncertain as to where it is proposed to construct such collecting chambers; uncertain as to the amount of land necessary for the right of way for the pipe, flumes, or conduits, or any of them; uncertain as to the amount of land necessary for the construction of the necessary collecting chambers.

(7.) It is uncertain as to what lands are sought for tunnels or fa-

tration galleries, or what tunnels or filtration galleries are proposed to be constructed, or where the same are to be constructed.

(8.) It is uncertain as to what property is sought to be condemned for headworks or how much of the said lands; or where the same *is* to be constructed.

(9.) It is uncertain as to what portion of the lands of this
9 defendant is proposed to be taken for rights of way for pipes, flumes, or conduits; and what portion of the lands of the defendant, Pomeroy, *are* to be taken for the said purposes.

(10.) It is uncertain as to what portion of the lands of this defendant *are* sought to be taken to construct the necessary collecting chambers, tunnels, or filtration galleries, or either or any of them; and what portion of the lands of the defendant, Pomeroy, *are* sought to be taken for the said purposes.

(11.) It is uncertain as to what portion of the lands of this defendant *are* sought to be taken for the operation or construction of the headworks, and what portion of the lands of the defendant, Pomeroy, *are* sought to be taken for such construction and operation of such headworks.

(12.) It is uncertain as to what the plaintiff proposes to construct or maintain on the lands of this defendant, or on the lands of the defendant, Pomeroy.

(13.) It is uncertain as to what interests in the lands of this defendant are sought to be condemned by the plaintiff, or what portions of the lands of this defendant *is* to be taken for each of the said purposes, and no means by which the defendant can ascertain the extent of the interests which can be taken by the plaintiff for the said purposes, or any of them.

(14.) It is uncertain as to in what portion of the lands of this defendant an easement is to be taken, or in what portion a fee-simple is sought to be taken, or can be taken.

III.

The said complaint is ambiguous in the particulars above specified under the ground of uncertainty.

IV.

10 The said complaint is unintelligible in the particulars specified herein in which the complaint is uncertain.

V.

There is a misjoiner of parties defendant in this action, in this: That it appears upon the complaint that the defendant, Pomeroy, has no interest in the tract of land described in the complaint as belonging to this defendant; and it does not appear from the said complaint that any right of way for any purpose sought to be condemned in the lands of this defendant, nor any right of any description sought to be condemned in the lands of this defendant, or any portion of the lands of the defendant sought to be condemned for any purpose is in any way connected with any condemnation of any portion of the lands of the defendant, Pomeroy, for any purpose;

and it does not appear that the purposes for which the land of the defendant is sought to be condemned would not be complete and entire, wholly independent of any condemnation of any portion of the land of the defendant Pomeroy.

VI.

Several causes of action have been improperly united in this action, in this: That it appears from the complaint that the defendants in this action each own separately a tract of land sought to be condemned, and it does not appear that the condemnation of any land of the other is in any way necessary to complete or perfect the objects or purposes or works sought to be established or constructed or operated in the lands of this defendant.

Wherefore, defendant prays that the action be dismissed; and that this defendant recover his costs.

CHAPMAN & HENDRICK,
*Attorneys for said Defendant.*

23 day of July, 1894.—Demurrer to compl't sustained & pl'ffs allowed 10 days to amend compl't.

11 Attest: T. H. WARD, *Clerk*,
By W. H. WHITTEMORE, *Deputy*.

July 1, 1895.—Demurrer to complaint sustained and pl't'ff allowed 10 days to amend complaint.

Attest: T. E. NEWLIN, *Clerk*,
By SHERMAN SMITH, *Deputy*.

Received copy of the within this 18th day of June, 189–.
C. McFARLAND,
*Attorney for Pl't'ff.*

Endorsed: Filed Jun- 18, 1894. T. H. Ward, clerk, by A. W. Seaver, deputy.

(Title of Court and Cause.)

*Demurrer of A. E. Pomeroy.*

Now comes the defendant, A. E. Pomeroy, and not waiving the motion to dismiss this action for want of prosecution, filed herewith, demurs to the complaint filed herein, upon the following grounds, to wit:

I.

The said complaint does not state facts sufficient to constitute a cause of action.

II.

The said complaint is uncertain in this:

(1.) It is uncertain as to what property the plaintiff seeks to condemn.

(2.) It is uncertain as to the purposes for which the said condemnation is sought.

(3.) It is uncertain as to the interest in the said property alleged to belong to this defendant which the plaintiff seeks to condemn.

(4.) It is uncertain as to what rights the plaintiff claims in the underground flow and percolating waters of the Los Angeles river.

(5.) It is uncertain as to what right of way is sought to be condemned, and there is no description of any right of way for pipe, flume, or conduit whatever.

12 (6.) It is uncertain as to what is meant by "necessary collecting chambers;" uncertain as to where it is proposed to construct such collecting chambers; uncertain as to the amount of land necessary for the right of way for the pipe, flumes, or conduits, or any of them; uncertain as to the amount of land necessary for the construction of the necessary collecting chambers.

(7.) It is uncertain as to what lands are sought for tunnels or filtration galleries, or what tunnels or filtration galleries are proposed to be constructed, or where the same are to be constructed.

(8.) It is uncertain as to what property is sought to be condemned for headworks, or how much of the said lands; or where the same *is* to be constructed.

(9.) It is uncertain as to what portion of the lands of this defendant is proposed to be taken for rights of way, for pipes, flumes, or conduits and what portion of the lands of the defendant, Hooker, *are* to be taken for the said purposes.

(10.) It is uncertain as to what portion of the lands of this defendant *are* sought to be taken to construct the necessary collecting chambers, tunnels, or filtration galleries, or either or any of them; and what portion of the lands of the defendant, Hooker, *are* sought to be taken for the said purposes.

(11.) It is uncertain as to what portion of the lands of this defendant *are* sought to be taken for the operation or construction of the headworks, and what portion of the lands of the defendant, Hooker, *are* sought to be taken for such construction and operation of such headworks.

(12.) It is uncertain as to what the plaintiff proposes to construct or maintain on the lands of this defendant, or on the lands of the defendant, Hooker.

13 (13.) It is uncertain as to what interest in the lands of this defendant *are* sought to be condemned by the plaintiff, or what portions of the lands of this defendant *is* to be taken for each of the said purposes, and no means by which the defendant can ascertain the extent of the interests which can be taken by the plaintiff for the said purposes, or any of them.

(14.) It is uncertain as to in what portion of the lands of this defendant an easement is to be taken, or in what portion a fee-simple is sought to be taken, or can be taken.

III.

The said complaint is ambiguous in the particulars above specified under the ground of uncertainty.

IV.

The said complaint is unintelligible in the particulars specified herein, in which the complaint is uncertain.

V.

There is a misjoinder of parties defendant in this action, in this: That it appears upon the complaint that the defendant, Hooker, has no interest in the tract of land described in the complaint as belonging to this defendant; and it does not appear from the said complaint that any right of way for any purpose sought to be condemned in the lands of this defendant, nor any right of any description sought to be condemned in the lands of this defendant, or any portion of the lands of the defendant sought to be condemned for any purpose, is in any way connected with any condemnation of any portion of the lands of the defendant, Hooker, for any purpose, and it does not appear that the purposes for which the land of the defendant is sought to be condemned would not be complete and entire, wholly independent of any condemnation of any portion of the land of the defendant, Hooker.

VI.

Several causes of action have been improperly united in this
14 action, in this: That it appears from the complaint that the defendants in this action each own separately a tract of land sought to be condemned; and it does not appear that the condemnation of any land of the other is in any way necessary to complete or perfect the objects or purposes or works sought to be established or constructed or operated in the lands of this defendant.

Wherefore, defendant prays that the action be dismissed, and that this defendant recover his costs.

CHAPMAN & HENDRICK,
*Attorneys for said Defendant.*

23 day of July, 1894.—Demurrer to compl't sustained, & pl'ff allowed 10 days to amend compl't.

Attest: T. H. WARD, *Clerk*,
By W. H. WHITTEMORE, *Deputy*.

July 1, 1895.—Demurrer to compl't is sustained and pl't'ffs were granted 10 days to amend.

Attest: T. E. NEWLIN, *Clerk*,
By SHERMAN SMITH, *Deputy*.

Received copy of the within this 18 day of June, 1894.

C. McFARLAND,
*Attorney for —.*

Endorsed: Filed Jun- 18, 1894. T. H. Ward, clerk; by A. W. Seaver, deputy.

(Title of Cause.)

MONDAY, *July* 23, 1894.

Motion to dismiss denied and demurrer of defendant, J. D. Hooker, and demurrer of defendant, A. E. Pomeroy sustained and ten days allowed plaintiff to amend complaint.

(Title of Court and Cause.)

*Stipulation.*

It is hereby stipulated in the above-entitled action that the complaint may be amended by striking out the words "rights of way" in the fourth line of the second page and the substitution therefor of the word "land," and that said complaint as so amended may stand as the amended complaint.

It is further stipulated that the demurrers filed to the original complaint may stand as demurrers to the amended complaint.

CHAPMAN & HENDRICK,
*Attorneys for Defendants.*
C. McFARLAND,
*Attorney for Plaintiff.*

August 1st, 1894.

Endorsed: Filed Sep. 4, 1894. T. H. Ward, clerk; by H. G. Johnson, deputy.

(Title of Court and Cause.)

*Amended Complaint.*

The plaintiff above named, by this amended complaint, complains of the above-named defendants, and for cause of action alleges:

I.

That plaintiff is a municipal corporation, in the State of California, organized and existing under the laws of said State.

II.

That the Los Angeles river is a non-navigable stream of water which rises in said county of Los Angeles, a few miles to the north and northwest of and above, and flows through, said city of Los Angeles and is fed by springs which rise to the surface in or adjoining the bed of said river.

That the bed of said river, from its source to the northern boundary of said city, is composed of sandy soil, into which the water sinks readily and forms subterranean streams flowing in well-defined channels beneath said bed, which said subterranean water rises to the surface in various places before reaching said city, and becomes a part of the surface water of said river.

That said river flows through both of the tracts of land
16 hereinafter described and sought to be condemned, before reaching said city.

III.

That the plaintiff is, and ever since its organization has been, the owner in fee-simple of the exclusive right to the use of all of the waters of said river from its source to the southern boundary of said city, in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, and of supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of plaintiff, and for other municipal uses in said city.

IV.

That plaintiff, since its organization, and within one year of, and prior to the commencement of this action, has taken measures to inaugurate a plan and system of, and intends to construct, water works by means of which it will divert the water of said river on the lands hereinafter described and sought to be condemned, and conduct the same to said city, for the purpose of supplying the inhabitants of said city with water for domestic use, including the sprinkling of flower garden- and grass plots, and for the purpose of furnishing a supply of water for the sprinkling of streets and parks, flushing of sewers and extinguishment of fires, and for other municipal uses, in said city; which said plan and system include the acquisition of said lands hereinafter described and sought to be condemned.

That said last-mentioned water works are to be constructed, operated, owned and controlled by plaintiff, and the distribution of said water, so to be diverted and conducted to said city as aforesaid, is also to be under the management and control of plaintiff.

V.

That, for the purpose of carrying out the said plan and sys-
17 tem so inaugurated as aforesaid, after the organization of plaintiff and before the commencement of this action, to wit, on the 8th day of June, 1893, an ordinance of the mayor and council of said city was duly passed, made and adopted, a copy of which said ordinance is hereunto annexed, marked "Exhibit A," and the same is hereby referred to and made a part hereof; which said ordinance is still in full force and effect.

VI.

That by said system and plan, so inaugurated by plaintiff as aforesaid, the water of said river is to be diverted by plaintiff on said lands by means of a submerged dam or dams, tunnels, filtration galleries, collecting chambers, settling reservoirs, or basins, and other means of proper and necessary for the diversion of said water on said lands.

That the greater part of the water of said river flowing on the surface therein below and to the east of said lands, come into said river beneath the surface at points adjoining the northern line of said lands, and that said subterranean water flowing beneath the surface of the bed of said river on said lands is purer and more

suitable to domestic use by the inhabitants in said city than the surface water of said river.

That the surface water of said river at all points above and below said lands is polluted to an extent which renders it liable to injure the health of the inhabitants of said city if used by them for domestic purposes.

That a large inhabited part of said city consists of hills so elevated as not to permit of the bringing of the water of said river thereon, unless the same be taken from a point so high up on said river as said lands; and that the water of said river could be conducted by gravity to nearly all of said hilly portions of said city if diverted from said river on said lands.

That the population of said city, at the time of the com-
18 mencement of this action, was not less than 70,000, having increased since the year 1880 to that number from less than 12,000 inhabitants; and that said population is constantly increasing, and said city is rapidly growing in extent of streets, parks, sewers and buildings, so that the amount of water needed to supply the inhabitants of said city for domestic purposes, including the sprinkling of flower gardens and grass plots, and to furnish water for the sprinkling of streets and parks, flushing of sewers and extinguishment of fires in said city, is fast increasing, to an extent that at any time in the future the whole of the water of said river, within the boundaries of said lands sought to be condemned, may be needed for said purposes.

That the system of water works, proposed to be constructed by plaintiff on said lands as aforesaid, is intended to be permanent for all future needs of said city for the purposes aforesaid, and the construction of said works will involve the expenditure by said city of several hundred thousand dollars.

That it is impossible to determine in advance of the construction of the same, the places where said tunnels, filtration galleries, settling reservoirs or basins, and collecting chambers, other than those delineated on the map attached hereto, should be constructed, and that it may be necessary, in the construction of said works, to use all and every portion of said land.

That it will be necessary, for the purposes aforesaid, for plaintiff to construct on said lands sufficient collecting chambers, tunnels, filtration galleries, settling reservoirs or basins, submerged dams, and other works sufficient to divert all of the waters of said river on said lands; and that, for the purposes aforesaid, it will be necessary to, and plaintiff will as soon as said lands are acquired by it, construct thereon the submerged dam, settling basins or reservoirs,
filtration galleries and tunnels, designated on the map here-
19 unto annexed, marked "Exhibit B" as "sub. dam," "settling basins," "main filtration gallery or tunnel," "lateral No. 1," "No. 2," "No. 3," and "No. 4," said terms "lateral No. 1," "No. 2," "No. 3," and "No. 4," indicating the position of tunnels or filtration galleries connecting with said main gallery or tunnel.

That said river, from year to year, shifts and materially changes its course and bed on said lands, in such manner that one or more

tunnels constructed on said lands at any particular point or points cannot always be relied on to intercept the water of said stream; and that, by reason of facts, and of the necessity of plaintiff's being able to supply said water at all times, for said purposes, it may, at any time, be necessary for plaintiff to make an immediate extension of the tunnels, filtration galleries, collecting chambers and other works, which may be constructed by it on said lands, or to construct new ones thereon, without the delay which would ensue if the right to so extend said works or construct new ones on said lands had to be acquired by condemnation proceedings.

That said lands are better adapted and more suitable and proper for the construction thereon of said works, so proposed to be constructed by plaintiff as aforesaid, than any other lands on said river.

That there is no source of water supply owned by plaintiff, except that from said river.

That it is necessary, for the proper control, management and protection of said works, so proposed to be constructed by plaintiff on said lands, as aforesaid, for plaintiff to acquire the fee-simple title to the whole of said lands; and that the public interest and necessity of said city demand the construction of said system of water works on said lands, sought to be condemned herein, and that in order to properly construct and maintain the same, it is necessary that the whole of said lands should be condemned in fee-simple for the use of plaintiff.

## VII.

That said lands consist of two separate tracts, and are situate in the county of Los Angeles, State of California, and are particularly described as follows:

First tract. Beginning at station No. 22 of the Los Feliz Rancho Patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 85 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42deg. E. 24.00 chains along said ranch boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision, as shown on plat of same, recorded in Book No. 17, pages 15 and 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. E. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 44 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65, to a stake on the south side of Los Angeles river, from which point a

blazed live-oak tree, 30 inches in diameter, bears N. 73 deg. E. 73 links distant; also a second blazed live-oak tree, 26 inches in diam-
21 eter, bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 — E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 81 deg. 24 min. E. 26.65 chains; thence N. 54 deg. .02 min. E. 27.90 chains to the place of beginning, containing 288.42 acres, more or less. The same being a portion of the Providencia Park tract.

Second tract. Beginning at the southwest corner of block 65 of the subdivision of the Providencia rancho and Scott tract; thence northerly along the westerly line of said block N. 22 deg. 15 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains, thence S. 81 deg. 28 min. E. 8.60 chains; thence S. 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning; containing 26.40 acres, more or less. The same being part of block 65 of the Providencia and Scott tract.

That a plat or map of said lands is hereunto annexed and marked "Exhibit B," showing the exterior boundaries of said above-described lands, and the location of said river, and of said submerged dam, settling basins or reservoirs, filtration galleries and tunnels, which are to be constructed thereon by plaintiff as aforesaid; which said map is hereby referred to and made a part hereof.

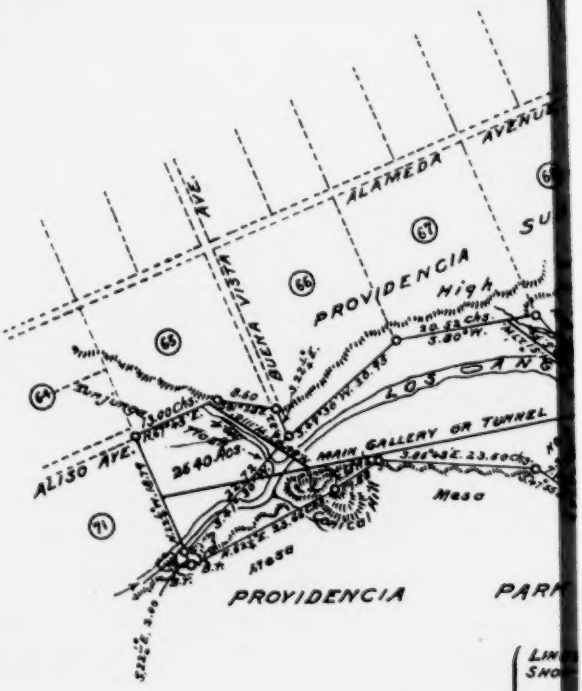
## VIII.

That, subject to said rights of plaintiff to said waters of said Los Angeles river, the defendant, J. D. Hooker, was, at the time of and after the commencement of this action, the owner in fee-simple of the tract of land hereinbefore firstly described; and the defendant, A. E. Pomeroy, was, at the time of and after the commencement of this action, the owner in fee-simple of the tract of land sec-
22 ondly above described; and that both of said tracts of land are required for the construction, operation and maintenance of said works, so proposed to be constructed by the plaintiff thereon, as aforesaid.

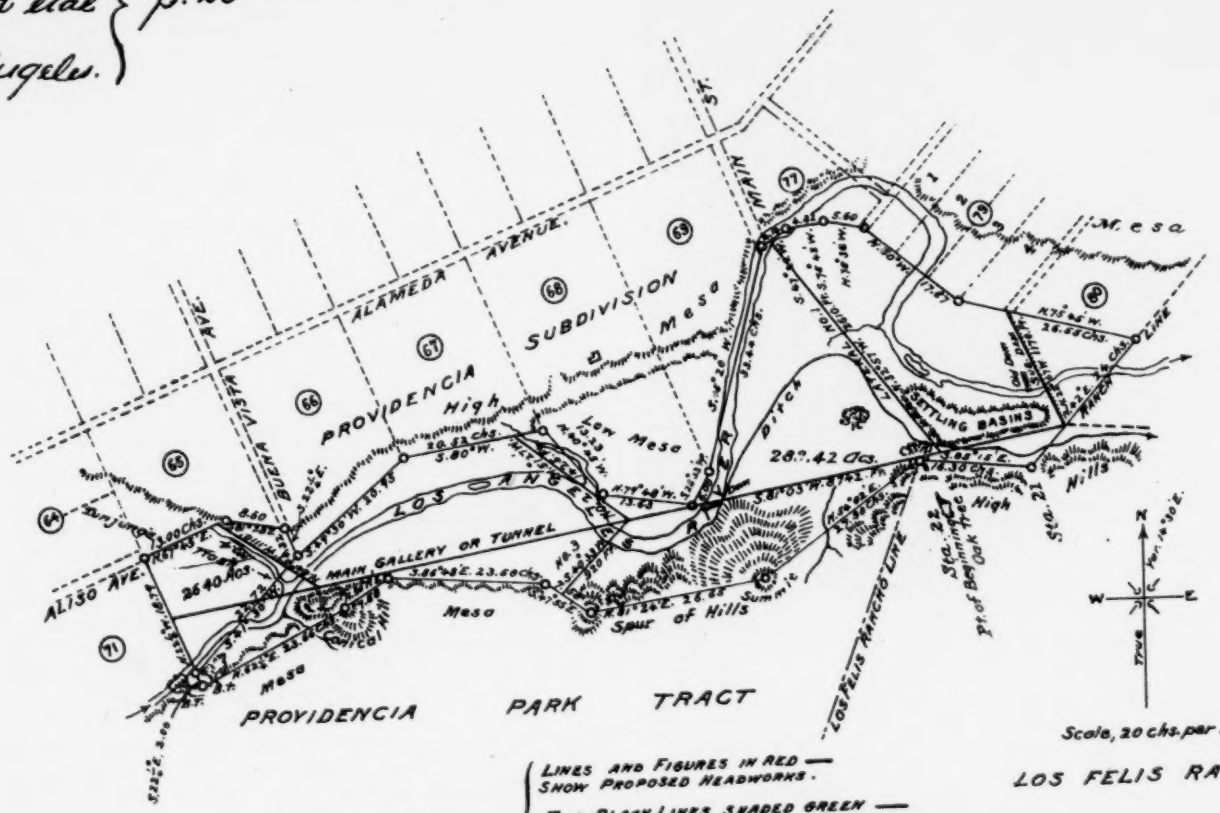
That said firstly described tract of land includes only a part of an entire parcel, which entire parcel belonged, at and after the commencement of this action, to the defendant, J. D. Hooker, and is described as follows, to wit: the "Providencia Park tract," according to the map of the subdivision of the Providencia rancho and Scott tract recorded in said recorder's office in Book 43 of Miscellaneous Records, pages 47 *et seq.*: containing 1,363.695 acres of land.

That said secondly described tract of land includes only a part of an entire parcel, which entire parcel belonged, at and after the commencement of this action, to the defendant, A. E. Pomeroy, and is described as follows, to wit: said block number sixty-five (65) of the said Providencia subdivision, according to the said map of said subdivision, recorded as aforesaid in Book 17 of Miscellaneous Records, pages 15, 16, 17 and 18: containing 70.13 acres.

No 390.
Hooker et al
v.
Los Angeles.
p. 23 a



No 390.
Hooker etal
v.
Los Angeles.
p. 23 a




Los Angeles Co. Cal.— Oct. 1895.

That plaintiff owns no water works by means of which water can be supplied to the inhabitants of said city for domestic use.

Wherefore, plaintiff prays judgment against the defendants, and each of them, for the condemnation in fee-simple of all the estate, right, title and interest of said defendants, and of each of them, of, in and to each of said two tracts of land described in paragraph VII of this complaint, and of the whole thereof; and that, after the damages to the defendants, and each of them, by reason of the taking of said property, shall have been estimated and ascertained, then said property be adjudged to vest in fee-simple in this plaintiff; and for such other or further orders, judgments and decrees as
23 may be reasonable or proper in the premises.

W. E. DUNN,
*City Attorney and Att'y for Plaintiff.*

LEE & SCOTT, *Of Counsel.*

(Here follows map marked p. 23*a*.)

"EXHIBIT A."

*Ordinance No.* 1717.

(New series.)

An ordinance authorizing the condemnation of certain land necessary for municipal purposes.

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. That it is necessary for municipal purposes that the following-described real property in the county of Los Angeles, State of California, be acquired by condemnation for the purposes of constructing head-works for a water system, to wit:—

First tract. Beginning at station No. 22 of the Los Felis rancho, patent boundary, and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 85 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said ranch boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the bounadry line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision; as shown on plat of same recorded in Book 17, pages 15 and 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23
24 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72

chains, to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65, to a stake on the south side of Los Angeles river, from which point a blazed live-oak tree, 30 inches in diameter, bears N. 73 deg. E. 73 links distance, also a second blazed live-oak tree, 26 inches in diameter, bears N. 65 deg. W. 50 links distance; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 81 deg. 24 min. E. 26.65 chains; thence N. 54 deg. .02 min. E. 27.90 chains to place of beginning, containing 288.42 acres more or less and being a portion of the Providencia Park tract.

Second, beginning at the southwest corner of block 65 of the subdivision of the Providencia rancho and Scott tract; thence northerly along the westerly line of said block N. 22 deg. 25 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence S. 22 deg. 15 min. E. 4.32 chains to the southeast corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning, containing 26.40 acres more or less, the same being a part of block 65 of the subdivision of the Providencia rancho and Scott tract.

SEC. 2. That the city attorney is hereby authorized to institute proceedings in the name of the city against the owners of said land in the superior court of Los Angeles county, for the purpose of determining the compensation to be paid to the owners of said land for the appropriation thereof, and to prosecute the same to a judgment.

SEC. 3. The city clerk shall certify to the passage of this ordinance and cause it to be published once in the Los Angeles Daily Herald, and thereupon and thereafter it shall take effect and be in force.

I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles, at its meeting of June 8, 1893.

C. A. LUCKENBACH, *City Clerk.*

Approved this eighth day of June, 1893.

T. E. ROWAN, *Mayor.*

Duly verified.

Endorsed: Filed Oct. 11, 1895. T. E. Newlin, clerk, by A. W. Seaver, deputy.

Received copy of within this 11th day of October, 1895. J. H. Chapman, attorney for —.

(Title of Court and Cause.)

*Demurrer.*

Now come the defendants in the above-entitled action, and demur to the second amended complaint herein, upon the following grounds.

I.

That the said second amended complaint does not state facts sufficient to constitute a cause of action.

II.

The said second amended complaint is uncertain in this: It is uncertain what are the necessities that require the condemnation of the said tracts of land; uncertain as to what are the works to be constructed; uncertain as to what quantity of the land will need to be taken; uncertain as to the rights which the plaintiff claims to own in the waters of the Los Angeles river; uncertain as to what, or for what reason, or for what purpose, or for the construction of what works, the said tracts of land are required; uncertain that any portion of either of the said tracts is necessary for any purpose of the city, plaintiff; and uncertain that the said lands,
26 or any part thereof, or of either tract thereof, is necessary for any purpose of the city.

Wherefore, defendants pray that the case be dismissed, and that the defendants recover their costs.

J. S. CHAPMAN,
*Att'y for Def'd'ts.*

Nov. 4, 1895.—Demurrer to complaint is overruled; 15 days to answer. Notice waived. Attest: T. E. Newlin, clerk; by Sherman Smith, deputy.

Endorsed: Filed Oct. 22, 1895. T. E. Newlin, clerk, by A. W. Seaver, deputy.

Received copy of within demurrer this 22d day of October, 1895. W. E. Dunn, attorney for plt., by T. F. Henny, ass't.

(Title of Cause.)

Nov. 4TH, 1895.

Demurrer to complaint is overruled and defendants are granted 15 days to answer. Notice waived.

(Title of Court and Cause.)

*Answer of Defendant to 2nd Amended Complaint.*

Now come the defendants in the above-entitled action, and answer the second amended complaint herein, and for such answer:

I.

The said defendants admit that they are the owners of the real property described in the said second amended complaint, and that the same consists of two different but contiguous tracts of land, and that the title to one of the said tracts, as the same appears of record in this county, is vested in one of these defendants, and that the title *of* the other, as appears of record in the said Los An-
27 geles county, is vested in the other of these defendants; but they allege that, as a matter of fact, both of the said defend-

ant- are interested in both of the said tracts, and they are the owners thereof as tenants in common, the title held by one party in either tract being held by himself for the benefit of himself and his co-defendant.

II.

The defendants deny that the Los Angeles river is fed by springs which rise to the surface in or adjoining the bed of the said river, but aver that the said stream has its sources in the mountains north of the city of Los Angeles, and the said river is supplied by the sources of the said main stream and its tributaries.

III.

They admit that the bed of the said river, from its source to the northern boundary of the said city, is for a considerable portion thereof, composed of sandy soil, but deny, upon information and belief, that the waters of the said stream, sinking into the sands or any portion of the bed, does readily, or at all, form well-defined subterranean streams, flowing in well-defined, or any, channels beneath the bed, or that such subterranean water, flowing in said channels beneath the said bed, rises in various, or any, places before reaching the city, or becomes a part of the surface water of the said river.

IV.

They deny that the said plaintiff is, or ever has been, the owner in fee-simple, or in any estate, of the exclusive, or any, right to the use of all the waters of the said river, from its sources to the southern boundary of the said city, either in trust for the public purposes of supplying the inhabitants of the said city with water for domestic uses, or for supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of the plaintiff, or for other municipal uses in the said city, or for any uses or purposes
28 whatsoever; and they deny that the said city of Los Angeles has any right in the said water, or rights to the use of the same, other than as is appurtenant to the said city as a riparian owner of lands through which the said river flows and rights acquired by appropriation and use thereof; and they deny that such right or use, either by appropriation or otherwise, has vested in the said plaintiff, or that the plaintiff now owns the right to the use of the said waters of the Los Angeles river to the exclusion of these defendants; but on the contrary they aver that the lands so owned by them are riparian to the said stream and situated far above the north boundary of the city of Los Angeles and above the point of diversion of the said waters from the said river by the said plaintiff, and that as such riparian owners they are entitled to the use of the waters of the said river for all lawful purposes and to a reasonable extent upon the said lands for irrigation, domestic and other uses, so long as the said use made by the said defendants is the reasonable use and exercise of the right of the riparian rights, which th-y possess and own.

V.

They deny upon information and belief, that the said plaintiff has, prior to the commencement of this action, taken any measures to inaugurate any plan or system of water works by means of which to divert the water of the said river on the lands described in the complaint and sought to be condemned, or to conduct the same to the city of Los Angeles, for the purpose of supplying the inhabitants of the said city with water for domestic uses, or any use, or for any of the purposes mentioned in the said amended complaint, or for any purposes whatever, or that any such plan includes the acquisition of the lands described in the complaint, or that such water works
29 are to be constructed, operated, owned or controlled by the plaintiff, or the distribution of the waters so to be diverted by the city is to be under the management or control of the plaintiff, but, on the contrary, these defendants aver, upon information and belief, that to construct the said works, make the said developments and conduct the said water to the city of Los Angeles and to distribute the same throughout its territory for the uses and purposes mentioned in the complaint, independently of the payment of awards to these defendants as compensation for the lands sought to be taken, would cost more than a million of dollars, and that the lands sought to be condemned in this action are of great value, to wit, of the value of $1,550,000.00 and defendants, on information and belief, aver that the current revenues of the city of Los Angeles for three years would not be sufficient to pay for the construction of any such system and for the condemnation of the lands of the defendants, and that such compensation cannot be made without the issuance and sale of bonds by the city to raise money for that purpose; and that no such bonds have ever been issued, nor have any proceedings been instituted for the issuance of such bonds, and the city of Los Angeles cannot from any funds it now has on hands, or from the current revenues of any year, make payment of compensation to the defendants for the said lands so sought to be condemned.

VI.

The defendants have no information or belief sufficient to enable them to answer the allegations in the fifth paragraph of the said amended complaint, that on the 8th of June, 1893, the ordinance annexed to the said complaint and marked "Exhibit A," was duly passed, and placing their denial upon that ground, they deny that the said ordinance was, at the time aforesaid or any other time, duly passed.

30 VII.

The defendants, upon information and belief, deny that the greater part of the water of the said Los Angeles river, flowing on the surface therein below and to the east of the said lands of the defendants, described in the complaint, comes into the said river beneath the surface at points adjoining the northern line of said lands, or that the said subterranean water, flowing beneath the bed of said river

on said land, is purer or more suitable for domestic use by the inhabitants in said city than the surface water of said river, and deny, upon information and belief, that any of the surface water of the said river, below the lands of the said defendants, come into the said river beneath the surface at the points aforesaid, and they aver, upon information and belief, that the waters percolating through the sands of the said river bed beneath the surface flow of the said water, is of the same kind as the waters flowing upon the surface.

VIII.

They deny, upon information and belief, that the surface water of said river above and below the said lands is polluted to an extent which renders it liable to injure the health of the inhabitants of the said city, if used by them for domestic purposes; but, on the contrary, aver that the said waters have been used by the said plaintiff for one hundred years and more and without detriment to the health of the people, and used for the said domestic purposes, as well as all other purposes.

IX.

Defendants admit that a large portion of the city of Los Angeles consists of hills so elevated as not to permit of the bringing of the water of the Los Angeles river upon the said hills, unless the said water be taken from a point as high up on the said river as
31 the said hills, and that the said water could be conducted by gravity to nearly all of said hilly portions of said city, if diverted from the said river on the said lands, but they deny that the condemnation of the whole of the tracts of land sought to be condemned in this action is necessary to enable the city to construct works for the purpose of diverting the said waters of the river upon the said lands and conducting them by gravity to the hilly portions of the city, or that any considerable portion of said lands is necessary for such purposes, but that the condemnation of five acres thereof would be sufficient for the construction of all necessary works for such a purpose.

X.

They admit that the increase of the population of said city will reasonably require the taking of substantially the whole of the waters flowing in the said Los Angeles river to the lands of these defendants for the uses and purposes of the city, but defendants aver that in their said lands, in the complaint described, there is a vast amount of percolating water which is the property of these defendants, and that in the said lands water can be developed by subterranean excavations of proper character, to a large amount, to wit, three thousand inches, measured under a four-inch pressure, and that the whole of the said waters belong to the said defendants as owners of the said land, as hereinafter more particularly set forth, and that the whole of the said waters are not necessary for supplying the inhabitants of the city of Los Angeles at any time within the near future by reason of an increase in the population that can reasonably be anticipated, and that the costs of developing the

said amount of water will be very considerable, and that no means have been supplied by the city, and it has no funds from which to pay the defendants a reasonable compensation for their said property; that the construction of
32 the works, such as are described in the said amended complaint, would develop a large amount of the said water and subtract the same from the soil of these defendants and would greatly impair the value of the remainder by reason of the said subtraction, and these defendants deny, upon information and belief, that the said plaintiff will, as soon as said lands are acquired by it, if acquired by it at all, construct therein the submerged dam, settling basins or reservoirs, filtration galleries and channels, designated on the map annexed to the said amended complaint, and marked "Exhibit B," with the designations thereon, and aver, upon information and belief, that the said city has no funds with which to construct any such works and cannot raise the same by any other means than by bonds, to be issued by the said city, to raise money for such purpose, and bonds to an amount sufficient for any such purpose have not been voted by the people of said city, nor have any proceedings been taken for the purpose of issuing the said bonds in such manner as provided by law.

XI.

The defendants admit that the said river is subject to changes in its course and bed on the said lands, but upon information and belief they deny that the waters that would be developed upon said lands by means of tunnels constructed therein would be fed by the waters of the Los Angeles river or dependent upon the course of the said bed for the supply of the waters so developed, and that the construction of tunnels at the proper points upon the said tracts of land could be relied upon to furnish the supply of water developed thereby, and which would not be affected by changes in the course of the bed of the stream, and they deny, upon information and belief, that by reason of any such changes in the course of the bed of the
33 river, it would be necessary for plaintiff to make an extension of the settling basins or reservoirs, filtration galleries, collecting chambers, or other works which may be constructed on said lands, or to construct new ones therein; but they aver, upon information and belief, that the construction of tunnels, filtration galleries, col-ecting chambers and other works necessary and proper to develop, collect and conduct the percolating waters in the said soil of the said defendants at the proper points on the said lands and in the proper manner, would subtract, collect, divert and conduct substantially the whole of the percolating waters in the said tracts, and that the amount of water so collected and diverted by said works would not in any manner depend upon the course of the flow of the surface streams of the river.

XII.

Defendants admit that their said tracts of land are better adapted and more suitable and proper for the construction of the said works, such as those described in the said amended complaint, and so pro-

posed to be constructed, than any other lands on the said Los Angeles river; but they aver that the reason therefor is that the said lands contain a large amount of percolating waters, and the said percolating waters can be more easily developed and collected than any other tract of land on the said river, and that the altitude of said tracts is such that said water would flow into the city of Los Angeles upon the elevated portions thereof by gravity, as well as to flow to other sections of the country to supply the lands outside of the city with water for irrigation and domestic purposes and uses.

XIII.

They deny, upon information and belief, that it is necessary, for the proper control, management or protection of the said works, described in the said amended complaint, to acquire the fee-simple title to the whole of said lands, of that the public interest or necessity of said city demands the condemnation thereof, but they admit that the proper construction of such a system on the said lands would, if extended through the whole of said lands, practically destroy the value of the entire tracts by draining therefrom the said waters percolating therein, and which constitute its chief value.

XIV.

The defendants further aver, that the said lands, described in the amended complaint, sought to be condemned in this action, are, and for more than five years last past have been, of great value for agricultural purposes, to wit, of the value of $150.00 an acre, and defendants further aver that the said lands have, during all of the said time, had a value over and above their value for agricultural purposes and have, during all of said times, had a special and peculiar value on account of the quantity of water percolating therein and which may be developed thereon, and which, by reason of the location of the said land and its altitude, said waters are valuable *ei*ther for supplying the city of Los Angeles or the farming communities to the east and west of the said city, and they allege, upon information and belief, that a large amount of water, to wit, three thousand inches, measured under a four-inch pressure, can be developed in the said land at points from which the said waters can be conducted either to the elevated portions of the city of Los Angeles and all other parts of said city, and also to the farming lands to the east and west of the said city and to other lands lying between the north boundary of said city and the location of the said lands described in the said amended complaint, and that the said land is of great value for and on account of the said waters percolating therein and which can be developed thereon and made valuable as aforesaid, to wit, of the value of $1,500,000.00.

XV.

These defendants aver that on or about the 23rd day of March, 1843, Manuel Micheltorena, then governor of both Californias, granted to Vincente de la Ossa the said tract of land in the county

of Los Angeles, State of California, known as the Providencia rancho; that afterwards and before the 11th day of September, 1852, David W. Alexander and Francis Mellus succeeded to and became vested with all the right, title and interest of the said Vincente de la Ossa in the said ranch, and on the said 11th day of September, 1852, David W. Alexander and Francis Mellus filed their petition before the board of land commissioners for the settlement of land titles in the State of California, appointed under the act of Congress of the United States, for the confirmation of their said claim, and thereafter and on the 18th day of October, 1853, the board of land commissioners aforesaid rendered a decree in favor of the said David W. Alexander and Francis Mellus, confirming the said grant, and afterwards an appeal was taken by the United States to the district court of the United States of the southern district of California, and such proceedings were therein had upon the appeal that afterwards it was by the said district court ordered, adjudged and decreed that the decision of the said land commissioners should be and thereby *were* confirmed and that the claim of the said David W. Alexander and Francis Mellus, appellees, to the said land, was valid; that afterward the United States appealed from the said decision of the district court to the Supreme Court of the United States and thereafter, the attorney general having given notice that the said appeal taken from the said decision would not be prose-
36 cuted, the said district court of the United States of the southern district of California at its December term, in 1856, ordered and decreed that the decision theretofore rendered in favor of the said Alexander and Mellus on the 6th day of August, 1872, — and the same was duly recorded in Book 1, page 238, of Patents, in the office of the county recorder of Los Angeles county, on the 14th day of April, 1873.

XVI.

The defendants further aver that the said lands, described in the said amended complaint, are contained within the patent boundaries of the said Providencia rancho, and are a part of the said Providencia rancho, and that these defendants are now the owners of the said tracts of land in fee-simple, claiming the title thereto under and through the said Mexican grant, and the proceedings for the confirmation thereof, and the said patent issued by the United States.

XVII.

That the said Los Angeles river flows through the said lands, so owned and held by these defendants, in its natural course.

XVIII.

Defendants further aver that as the owners of the said lands, they are also the owners of all of the waters percolating in the soil thereof, and are, also, riparian owners, having the rights of riparian proprietors, in said waters of the Los Angeles river.

Wherefore, defendants pray that the application of the said plaintiff to condemn the said lands be denied, and that if the same be

granted that then these defendants be awarded compensation therefor in the sum of one million five hundred and fifty thousand dollars, and costs, and such other relief as may be just.

J. S. CHAPMAN,
*Attorney for Defendants.*

37 Duly verified.

Received copy of within answer this 30 day of December, 1895. W. E. Dunn, attorney for plaintiff.

Endorsed: Filed December 31, 1895. T. E. Newlin, clerk; by A. W. Seaver, deputy.

(Title of Cause.)

FRIDAY, *February 28th*, 1896.

Upon motion of plaintiff, and by leave of court, the prayer of complaint is amended by interlining, and demurrer to the amended complaint heretofore filed is considered as a demurrer to the complaint as amended, and said demurrer is overruled.

(Title of Court and Cause.)

*Demurrer to 3d Amended Complaint.*

Now come the defendants in the above-entitled action, and demur to the third amended complaint herein, upon the following grounds:

I.

That the said third amended complaint does not state facts sufficient to constitute a cause of action.

II.

The said third amended complaint is uncertain in this: It is uncertain what are the necessities that require the condemnation of the said tracts of land; uncertain as to what are the works to be constructed; uncertain as to what quantity of the land will need to be taken; uncertain as to the rights which the plaintiff claims to own in the waters of the Los Angeles river; uncertain as to what, or for what reason, or for what purpose, or for the construction of what works, the said tracts of land are required; uncertain that any portion of either of the said tracts is necessary for any

38 purpose of the city, plaintiff; uncertain that the said lands, or any part thereof, or of either tract thereof, is necessary for any purpose of the city; uncertain as to what is the estate that the defendants are admitted to own in the said land, and what estate in said lands is sought to be condemned; uncertain as to what property the defendants own that it is necessary to condemn, and uncertain as to what waters are claimed to constitute the Los Angeles river.

III.

Several causes of action are improperly united in the said third amended complaint, in this: that a cause of action to determine

rights in the waters of the Los Angeles river and the waters percolating beneath its bed, claimed to be owned by the plaintiff and which claim is controverted by the defendants, is improperly united with an action to condemn, for a public use, property admitted to be owned by the defendants.

Wherefore, defendants pray that the case be dismissed, and that the defendants recover their costs.

JOHN G. NORTH,
R. H. F. VARIEL, AND
J. S. CHAPMAN,
*Attorneys for Plaintiff.*

MARCH 26, 1896.

Demurrer to 3rd amended complaint is overruled.

Attest: T. E. Newlin, clerk; by Sherman Smith, deputy.

Received copy of the within demurrer this 24 day of March, 1896, without wa-ver. Lee & Scott, attorneys for plaintiff.

Endorsed: Filed March 24, 1896. T. E. Newlin, clerk; by Sherman Smith, deputy.

39 (Title of Court and Cause.)

*Amendments to Defendants' Answer.*

Now come the above-named defendants, and by leave of the court first had and obtained, file this amendment to their answer to plaintiff's second amended complaint filed herein, as follows, to wit:

I.

At the end of paragraph XV of said answer, add the following, to wit:

"The defendants aver, that on or about the 8th day of November, 1852, Francis Mellus, David W. Alexander, and Augustin Olvera presented their claim to the board of land commissioners, appointed under the act of Congress aforesaid, for the settlement of private land claims in the State of California, for the confirmation of their title to a tract of land known by the name of Cahuenga, situated in the said county of Los Angeles and State aforesaid, their said claim being founded upon a Mexican grant, which had been made by Manuel Micheltorena, on or about the 5th day of March, 1843, he being then governor of the department of both Californias, to one Jose Miguel Triunfo, they the said Alexander, Mellus and Olvera, having previous to that time, succeeded to the title of the said Mexican grantee, and on or about the 15th day of November, 1853, the said claim was confirmed by the said board of land commissioners, and afterwards, upon an appeal to the district court of the United States for the southern district of California, the said district court at its December term, in 1856, rendered its decree, confirming the said claim, and decreeing that the claim of the said Alexander, Mellus and Olvera was good and valid, and after said final confirmation a patent was duly issued by the United States to

the said David W. Alexander and others above named, giving
40 and granting to them the said tract of land known as Cahuenga, the said patent being issued upon a confirmation of the said Mexican grant on the 2nd day of August, 1872.

The defendants further aver, that on or about the 20th day of October, 1784, a grant was made by Pedro Fajes to Julio Berdugo and others of a certain tract of land of eight square leagues, situated in Los Angeles county, and bounded upon the western side thereof by the Los Angeles river and known as the San Rafael rancho, and which said grant was subsequently, to wit, on the 12th day of January, 1798, confirmed to Jose Maria Berdugo, and after the acquisition of the State of California by the United States Government a claim to the said grant was presented to the board of land commissioners, appointed under the act entitled, "An act to ascertain and settle the private land claims in the State of California, approved March 3rd, 1851," on the 21st day of October, 1852, and the said claim to the said San Rafael rancho was confirmed by the board of land commissioners, on the 11th day of September, 1855, and finally confirmed by the United States district court on June 4th, 1857, and thereafter, to wit, on the 28th day of January, 1882, a patent was duly issued by the Government of the United States, granting the said tract of land known as the San Rafael rancho to Julio Berdugo and Catalina Berdugo."

II.

Strike out all of paragraph XVI of said answer and substitute in lieu thereof, after the number, XVI, the following, to wit

"The defendants further aver that the said lands described in the said amended complaint are contained within the patent boundaries of, and comprise part and portions of the said Providencia rancho, the said Cahuenga tract, and the San Rafael rancho;

41 "And that these defendants are now the owners of the said tracts of land described in the plaintiff's amended complaint herein, in fee-simple, claiming the title thereto under and through the aforesaid Mexican and Spanish grants, and the proceedings for the confirmation thereof, and the said patents issued by the United States, founded thereon."

III.

Amend paragraph VI to read as follows:

"The defendants answering the allegations in the fifth paragraph of the said amended complaint contained, that on the 8th day of June, 1893, and prior to the commencement of this action, the ordinance annexed to the said complaint was duly passed, upon information and belief, deny, that said ordinance at the time aforesaid, or at any other time prior to the commencement of this action, was duly or otherwise passed.

They deny that said ordinance was ever passed or in force or effect, or that it had gone into force or effect prior to the commencement of this action;"

"But on the contrary they allege that said ordinance by its ex-

press terms was required to be published one day before it could go into effect, and that it could not be published, and was not in fact published, until on the morning of the 9th day of June, 1893, and that by its terms it did not take effect, or go into force until the morning of the said 9th day of June, 1893, and being the next day after the commencement of said action."

Dated March 5th, 1896.

J. S. CHAPMAN,
JOHN G. NORTH, AND
R. H. F. VARIEL,
*Attorney- for Defendants.*

Duly verified.

Endorsed: Filed March 5, 1896, T. E. Newlin, clerk; by Sherman Smith, deputy.

42 Received copy of the within this 5th day of March, 1896.

LEE & SCOTT,
W. E. DUNN,
*Attorneys for Plaintiff.*

(Title of Court and Cause.)

*Defendants' First Bill of Exceptions.*

Be it remembered; that on Wednesday, the 19th day of February, 1896, the above-named defendants served and filed in the above-entitled cause a notice of motion to stay all proceedings therein, for the purposes and times and upon the grounds stated in said notice of motion, and the affidavits of J. S. Chapman and A. E. Pomeroy accompanying the same and served and filed therewith, and which said notice of motion stated that the same would be called up for hearing before said court on Monday, the 24th day of February, 1896, at ten o'clock a. m. of that day, or as soon ther-after as counsel could be heard, and in pursuance of an order shortening the time of notice made on February 20th, 1896, by the judge of department 5 of said court, and a copy of which order shortening time was served with said motion and affidavits; and which said notice of motion and the said affidavits accompanying the same, together with the said order shortening time are as follows, to wit:

(Title of Court and Cause.)

To Messrs. Lee and Scott and W. E. Dunn, attorneys for the plaintiff:

Notice is hereby given, that the defendants will, on Monday, the 24th day of February, 1896, at 10 o'clock a. m., of said day or as soon thereafter as counsel can be heard for that purpose, move the court, in department five, to stay the proceedings in this action

43 until the rights of the parties in the lands sought to be condemned and in the waters of the Los Angeles river, and the waters flowing beneath the surface in the bed thereof, along the lands of these defendants, and in the waters percolating in the soil

of said lands, have been finally determined by a court of competent jurisdiction. The said motion will be made upon the minutes and files of the court and the affidavits of J. S. Chapman, one of the attorneys for the defendants herein, and of A. E. Pomeroy, one of said defendants, copies of which are served herewith, and will be made upon the ground that the rights of the respective parties to this suit, to wit, the plaintiff on the one side, and of these defendants, on the other, are in controversy in one suit now pending in department five of this court, and in the said affidavits more particularly described, and another in the United States circuit court, in the ninth circuit for the southern district of California, and also referred to in said affidavits, and that the rights in controversy in said suits are as to the right of the defendants herein to the use of the waters of the Los Angeles river as riparian owners, and the right to the waters percolating in the lands belonging to them and in this action described, and the right of the plaintiff herein to the waters flowing beneath the surface in the bed of said river, and the right of the said plaintiff to enter upon the lands of the said defendants to develop the said waters underneath the said bed, and which said rights are asserted by the plaintiff in this action, as appears upon the face of the amended complaint herein, and upon the ground that the said defendants are entitled to have their rights as riparian owners and to the waters flowing beneath the bed of the Los Angeles river through the lands of these defendants, and to the waters percolating in the soil of these defendants, determined before
44 a jury can properly estimate or determine the compensation to be paid to these defendants for the taking of the said property.

You are further notified that the time of hearing the said motion and service of the notice thereof, has been shortened by the judge of the said department five, and a copy of the order shortening the time is served herewith.

R. H. F. VARIEL AND
J. S. CHAPMAN,
*Attorneys for said Defendants.*

Endorsed: Filed Feb. 19, 1896, T. E. Newlin, clerk; by C. G. Keyes, deputy. John S. Chapman.

(Title of Court and Cause.)

*Affidavit of J. S. Chapman.*

STATE OF CALIFORNIA, }
*County of Los Angeles,* } *ss:*

J. S. Chapman, being duly sworn, deposes and says: That he is one of the attorneys for the defendants in this action. that on or about the 19th day of August, 1893, the City of Los Angeles brought an action in this court against the defendants, A. E. Pomeroy and J. D. Hooker, John Doe and Richard Doe, by filing a complaint in this court and issuing a summons thereon, and in which said com-

plaint said plaintiff set forth and alleged, among other things, that the City of Los Angeles is the owner of all the waters of the Los Angeles river, and of its subterranean flow, springs and sources, from its source to where the same leaves the south boundary limits of said city, and that the said city was the owner of an irrigating ditch or canal, leading from the Los Angeles river at a point upon the Providencia ranch and upon the lands which in this action are sought to be condemned, and which lands belong to these defendants and alleging that the said ditch or canal had a capacity of four hun-
45 dred miners' inches of water, and extended from the said point of diversion from the Los Angeles river on the Providencia ranch to the city of Los Angeles, and the said water so diverted by means of the said ditch was used by said city for supplying its inhabitants with water for domestic uses, irrigating purposes, fire purposes, flushing of sewers, and irrigating and supplying public parks with water, and that the said city, for more than twenty years, had maintained a dam upon the said Providencia ranch and at the said point on the lands of these defendants, sought in this action to be condemned, and at or near the termination of the said ditch which dam was necessary to divert the waters of the said river into the said ditch; and the said city of Los Angeles in the said action claimed to — the owner of the said dam and ditch and an easement upon the said lands of these defendants to maintain the said dam and to use the said ditch to divert the said water, to wit four hundred miners' inches, from the said Los Angeles river at the said point, and to convey the same across the lands of these defendants to the city of Los Angeles, and there to furnish the same to the inhabitants of the said city for domestic and other uses; and the said City of Los Angeles further alleged, in the said complaint, that these defendants entered upon the said ditch and diverted the waters therefrom, and caused the same to flow back into the river and destroyed the dam, so as to prevent the waters of the said Los Angeles river from flowing into said ditch, and that they threaten to continue to divert said water from said ditch, and to prevent it from flowing therein; and the said city in the said complaint in said action further alleged that the said City of Los Angeles had, through its officers and agents continually from the foundation of the pueblo in 1786, appropriated and used all the waters of said river, including its springs and
46 sources and percolating waters, and had taken same out by a system of dams, ditches and canals and distributed the same among its inhabitants, and prayed judgment against the defendants, enjoining them, and their agents, from interfering with the said dam, ditch or waters flowing therein, or preventing the waters of the river from flowing into said ditch and for such other relief as equity might require; and in said action these defendants appeared and made answer to the said complaint, and in said answer they denied that the City of Los Angeles was the owner of all, or any part of the waters of the Los Angeles river, or of all or any part of its subterranean flow or springs or sources, at any point whatever above or west of the land constituting the west boundary of what is

known as the Los Feliz rancho, and which said rancho lies below the point of diversion by said city by means of said ditch, located upon the lands of these defendants as aforesaid, and they denied the said city's ownership of any part of the waters of said river, or its springs or sources, or surface or subterranean flow, at any point whatsoever along and where the said river crosses the lands known as the Providencia rancho, or the San Rafael rancho, and owned by the said defendants, as in their said answer described, and the said defendants in said action alleged that they were the owners of certain lands in the said Providencia rancho and San Rafael rancho and which were described in the said answer, and being the same sought to be condemned in this action; and further alleged that the said Los Angeles river flowed through and over the said lands owned by the defendants, and that, as the owners of said lands through which the said river flowed they were themselves owners of the waters of the said Los Angeles river, both surface and subterranean, and were entitled to use the same for all
47 beneficial purposes upon their said lands as such riparian owners; and they further alleged that they were the owners absolutely of the subterranean flow, springs and sources of the said river upon and in their said lands, and that they, as owners in fee of the said lands, owned and were entitled to develop therein and divert therefrom the waters percolating or flowing through or underneath the same, and that the said City of Los Angeles was not the owner of any part of the said waters of said river or subterranean flow, springs or sources, at any place upon the said lands of the said defendants in that action, nor entitled to enter upon the said lands at any points therein to divert the said waters therein or therefrom by means of dams, ditches or otherwise; the said defendants in the said action denied that the plaintiff was the owner of the said ditch or of the said dam or of the right to maintain the said dam or use the said ditch upon the lands of the said defendants for the purpose of diverting the waters from the Los Angeles river or conduct the same through the said ditch, or for any other purpose whatever; they denied that without right they entered upon the said ditch at any time and diverted the water therefrom or caused it to flow back into said river, or destroyed the said dam in whole or in part; they set up in the said answer that the use of the said ditch by the said city previous to the time of the commencement of the said action, had begun and had continued by a contract made by its predecessor, the Citi-ens' Water Company, with these defendants and which contract, by its terms, provided for its termination by either party upon notice to the other, and that, prior to the diversion of the water from said ditch by the defendants, the said contract had been terminated by the successor of the Citi-
zens' Water Company, and that it was not until after the
48 said determination of the said contract that they prevented the water from being diverted by means of said dam and ditch; and this affiant further says, that the said action was brought in this court, and in department five, and though an opinion has

been rendered in the said action by the judge of the said court, that findings of fact and judgment have not yet been entered in the said action, and the said action is now pending and undetermined, and the said rights so asserted and claimed by the plaintiff in this action in the said suit number 20014 are denied by these defendants, and are in controversy and undetermined in said action; affiant further says, that on the 14th day of February, 1896, these defendants brought suit in the circuit court of the United States, in the ninth circuit, for the southern district of California, alleging their ownership of the said lands, and setting forth their rights to the waters of the Los Angeles river as riparian owners and their right and title to the percolating waters in the said soil, and claimed to be the owners in fee of the said tracts of land, and of the percolating waters, and of the right to the use of the waters of the Los Angeles river as riparian owners for the reasonable irrigation of the said lands, and for domestic uses and all other uses and purposes, to which, as riparian owners, they are entitled, and praying for a determination of their said rights in the said lands, and to enjoin the defendant from asserting any rights therein adverse to the title of the defendants in this action, plaintiffs in the said suit in the said United States circuit court, and that a subpœna has been issued out of said court and the said suit is now pending and undetermined therein; affiant further says, that by referring to the pleadings in this present action, it will be seen that, although the said action is brought ostensibly to condemn the prop-
49 erty of these defendants and to take the same for public use, yet nevertheless the said City of Los Angeles is, in the said action, asserting rights in the said property, claiming to be the owner of the whole of the waters of the Los Angeles river, denying any right on the part of these defendants therein, and claiming to be the owner of the waters flowing beneath the bed of the said Los Angeles river in the lands of these defendants aforesaid, and are seeking to condemn said lands as though these defendants were not entitled either to the said waters percolating in the said lands or flowing in the said Los Angeles river; and affiant further says, on information and belief, that the lands of the said defendants are of much greater value if the said defendants are entitled to the reasonable use of the waters of the said river upon said lands for useful and beneficial purposes, than they would be without it, and that the waters percolating in the said lands constitute its chief value, and that a jury cannot make a fair and just estimate of the compensation to be paid to these defendants for the property so sought to be taken, until there has been a final determination of the rights of the respective parties to this suit, to wit, of the City of Los Angeles, on the one side, and of these defendants on the other, both with respect to the waters of the Los Angeles river flowing on the surface thereof, and the waters flowing beneath the surface of the said stream, and of the waters percolating in the said soil.

And further affiant saith not.

J. S. CHAPMAN.

Subscribed and sworn to before me this 19th day of February, 1896.

[NOTARIAL SEAL.] CHARLES ALLIN,
*Notary Public in and for the County of Los Angeles, State of California.*

50 Endorsed: Filed Feb. 19, 1896. T. E. Newlin, clerk; by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Affidavit of A. E. Pomeroy.*

STATE OF CALIFORNIA, *County of Los Angeles,* } ss:

A. E. Pomeroy being duly sworn, deposes and says: That he is one of the defendants in this action, and one of the owners of the lands sought to be condemned, and that the value of the said lands so owned by the defendants is of a far greater value if it be established that the ownership of said lands entitled the owner thereof to the reasonable use of the waters flowing in the and of supplying the water for the irrigation of Los Angeles river for domestic and irrigation purposes, and other uses which, as riparian owners, might be made thereof, than without such right; and that the value of the said lands with such rights, over and above their value without such rights, would be more than ten thousand dollars; and that the percolating waters in the said soil constitute its chief value, and if the said defendants are the owners thereof, that said land is worth more than a million dollars, more than it would be worth if the ownership of the said waters is in the city of Los Angeles; and affiant further says that if the City of Los Angeles owns the waters flowing beneath the bed of the said stream and can take the same therefrom and conduct them away from the said lands by means of the works which it seeks to construct, that the value of defendants' lands would be thereby reduced to not more than one-fiftieth of what the said lands would be worth, if the ownership of the said percolating waters or subterranean flow of the said water belongs to the said lands; and affiant further says that it is not possible to

51 properly prepare for the presentation of this cause, or to make the proof of the damage done to these defendants by the taking of the said lands, or the compensation which ought to be paid, until they are advised by a final adjudication by a court of competent jurisdiction what is the extent of their rights in the waters of said river and in the waters percolating in said lands.

And further affiant saith not.

A. E. POMEROY.

Subscribed and sworn to before me this 19th day of February, 1896.

[NOTARIAL SEAL.] CHARLES ALLIN,
*Notary Public in and for the County of Los Angeles, State of California.*

Endorsed: Filed Feb. 19, 1896. T. E. Newlin, clerk; by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Order Shortening Time.*

It is hereby ordered, that the time of hearing the motion to stay proceedings in this action, upon the annexed papers, is hereby shortened and the hearing of the said motion is set for ten o'clock on Monday, the 24th day of February, 1896, the service of said papers and a copy of this order to be made not later than five o'clock on Thursday, the 20th day of February, 1896.

LUCIEN SHAW, *Judge.*

Dated February 19, 1896.

Received copy of the within order, notice, affidavit of A. E. Pomeroy and affidavit of J. S. Chapman, this 19th day of February, 1896. Lee & Scott, attorneys for plaintiff.

And the said motion coming on to be hear- upon the record, papers and proceedings mentioned in said notice of motion, on the said 24th day of February, 1896, in said department 5 of said superior court, Honorable Lucien Shaw presiding; and the
52 same having been argued and submitted to the court for its ruling thereon;

And the said court having thereafter to wit, on Tuesday the 25th day of February, A. D., 1896, made and entered an order in said court directing that the said motion be denied; to which ruling and order of the court the defendants then and there excepted;

Whereupon the defendants present this bill of exceptions setting forth the said notice of motion, affidavits and order shortening time and the ruling of the court thereon, with the exception of defendants thereto, and ask that the same be settled and signed by the judge of said court who heard said motion, and that the same may be filed as defendants' bill of exceptions herein.

The foregoing bill of exceptions is hereby settled and allowed this 2nd day of March, 1896.

LUCIEN SHAW,
*Judge of the Superior Court.*

Receipt of the within proposed bill of exceptions is hereby admitted this 26 day of Feb'y, 1896, and copy waived. Lee & Scott, attorneys for plaintiff.

Endorsed: Filed March 27, 1896, T. E. Newlin, clerk; by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Defendants' Second Bill of Exceptions.*

Be it remembered, that on Tuesday the 25th day of February, 1896, the above-named defendants served and filed in the above-entitled cause, a notice of motion to strike out certain paragraphs of the plaintiff's amended complaint filed in the above-entitled cause.

That the attorneys for the plaintiff accepted said notice in the following language: "Service of the within notice & motion
53 is hereby admitted this 25 day of Feb'y, 1896, without waiver of any point except time of notice not being five days;" and which said notice of motion together with the indorsements thereon, was and is in the words and figures as follows, to wit:

(Title of Court and Cause.)

*Notice of Motion to Strike Out.*

Please take notice that on Friday, the 28th day of February A. D. 1896, at 10 o'clock a. m., and on the opening of court on that day, or as soon thereafter as counsel can be heard, in department five of the above-entitled court, the defendants will move to strike out the following portions and paragraphs of the plaintiff's amended complaint filed herein, as follows, to wit:

I.

Strike out of paragraph II of said amended complaint the allegation comprised in the following words: "And is fed by springs which rise to the surface in or adjoining the bed of said river."

II.

Strike out the following allegation from paragraph II of said amended complaint, containing the following words, to wit:

"That the bed of said river from its source to the northern boundary of said city is composed of sandy soil, into which the water sinks readily and forms subterranean streams, flowing in well-defined channels beneath said bed, which said subterranean water rises to the surface in various places before reaching said city and becomes a part of the surface water of said river."

III.

Strike out all of paragraph III of said amended complaint, containing the following words, to wit:

"That the plaintiff is, and ever since its organization has
54 been, the owner in fee-simple of the exclusive right to the use of all of the waters of said river from its source to the southern boundary of said city, in trust for the public purposes of supplying the inhabitants of said city, with water for domestic uses, and of supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of plaintiff, and for other municipal uses in said city."

Said motion will be made upon the ground that the foregoing paragraphs asked to be stricken out are, and each of them is, irrelevant and redundant matter inserted in said amended complaint.

This proceeding being one for the condemnation of the fee of land, together with whatever else may be necessarily included as a part thereof, or as incidental thereto under the name of land; it

therefore is a proceeding in which it is not competent for the plaintiff to have settled or determined, or to otherwise have quieted or adjudicated its title in or to any part of defendants' land, or to any water rights, either riparian, surface, percolating or subterranean therein or thereon, or any easements in or over defendants' lands, or any rights or interests of any kind therein or thereon;

And upon the further ground, that inasmuch as this is a special proceeding, the above-entitled court has no jurisdiction to settle or determine therein any issue as to the title to land or to water or water right, or to any interest therein, or any easements through or over the same which may be suggested or tendered by plaintiff's complaint asking condemnation;

And upon the further ground that while the above paragraphs might be material allegations in an action brought in a proper court to determine an adverse interest in or to quiet its title to an
55 alleged right of the plaintiff in or to all of the surface, riparian and subterranean waters comprising a part of or flowing under the bed of the Los Angeles river, they are not relevant to the statement of plaintiff's right to have a condemnation of defendants' property.

Said motion will be based upon the pleadings, papers, documents and proceedings on file in the above-entitled court.

Dated February 25th, 1896.

J. S. CHAPMAN AND
R. H. F. VARIEL,
*Attorneys for Defendants.*

To Messrs. W. E. Dunn and Lee & Scott, attorneys for plaintiff.

Service of the within notice & motion is hereby admitted this 25 day of Feb'y, 1896, without any waiver of any point except time of notice not being five days. Lee & Scott, attorneys for pl't'ff.

Endorsed: Filed Feb. 25, 1896, T. E. Newlin, clerk, by C. G. Keyes, deputy clerk.

That thereafter to wit, on Friday, the 28th day of February, 1896, at 10 o'clock a. m., being the time called for the trial of the above-entitled action, and before the pleadings were read upon the trial of said action, and before such trial had commenced, said motion came on to be heard in said court, and was submitted therein for decision, whereupon the court there and then made an order directing that the said motion be denied, to which ruling and order of court the defendants then and there excepted.

Wherefore, the defendants pres-nt this bill of exceptions setting forth the said notice of motion, ruling of the court thereon, with the exception of the defendants thereto, and ask that the same be settled and signed by the judge of said court who heard said motion
56 and that the same be filed as defendants' second bill of exceptions herein.

Dated February 28th, 1896.

JOHN S. CHAPMAN,
JOHN G. NORTH, AND
R. H. F. VARIEL,
*Attorneys for Defendants.*

The foregoing bill of exceptions is hereby settled and allowed this 21st day of March, 1896.

LUCIEN SHAW,
*Judge of the Superior Court.*

Consented that above bill be settled & allowed as presented. This, March 21, 1896.

LEE & SCOTT,
*Attorneys for Pl'ff.*

Received M'ch 2, 1896. Lee & Scott, attorneys for pl'ff.
Endorsed: Filed Mar. 27, 1896. T. E. Newlin, clerk; by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Verdict.*

We, the jury, in the above-entitled action, find as follows:
1. The value of an estate in fee-simple in the lands described in the complaint, including all their elements of value, subject to the paramount right of the city of Los Angeles to take from the Los Angeles river, from time to time, all the water that may be needed at such time for the use of the inhabitants of said city, and for all municipal and public uses and purposes therein, is the amount of $23,000

2. The land described in the complaint constitutes only a part of a larger parcel, and the damages which will accrue to the portion not sought to be condemned by reason of its severance from the portion sought to be condemned, and the construction of the
57 improvements and works in the manner proposed by the plaintiff, amount to the sum of $2,000.

3. The portion of defendants' land not sought to be condemned will not, nor will any of it, be benefited by the construction of the improvement and works as proposed by plaintiff.

4. No property of the defendants will be benefited at all by any diversion by plaintiff of water from its natural course nor by any distribution or delivery of water proposed to be made by plaintiff.

HORATIO N. RUST, *Foreman.*

Endorsed: Filed Apr. 1, 1896. T. E. Newlin, clerk, by Sherman Smith, deputy.

(Title of Court and Cause.)

*Findings.*

The above-entitled action having been tried before the court with regard to the issues arising on the pleadings, and the issue as to compensation to be allowed to the defendants having been submitted to the jury, the court now finds upon said issues so tried before it as follows:

I.

All of the allegations of the last amended complaint, excepting paragraph III thereof, are true.

II.

With regard to paragraph III of said complaint, the court finds that the plaintiff is, and ever since its organization has been, the owner in fee-simple of the paramount right to the use of all of the waters of the Los Angeles river described in said complaint, from its source to the southern boundary of said city, so far as may be needed from time to time, and in trust for the *the* public purposes of supplying the inhabitants of said city with water for domestic uses,
and of supplying the water for the irrigation of the irrigable
58 lands embraced in the four square leagues of the pueblo lands of plaintiff, and for all other municipal and public uses and purposes in said city.

III.

That the defendants have, subject to the said rights of plaintiff, the rights as riparian proprietors of the lands of which the lands sought to be condemned form part, the riparian right to use the water of said river for any and every purpose (which would not interfere with the equal rights or injure the lands of other riparian proprietors along said river above and below said lands), for which riparian proprietors are entitled to use such water.

IV.

All of the allegations contained in paragraph I of the answer as amended are true.

V.

All of the allegations of paragraph XV of said answer as amended are true.

VI.

All of the allegations of paragraph XVI of said answer as amended are true.

VII.

It was stipulated between the parties to this action, during the trial and before the submission of the case to the jury, that all of the lands described in the complaint of which the lands sought to be condemned form a part, should be treated as one parcel, and that said lands sought to be condemned should be treated as one parcel, and the court therefore finds that all said lands described in the complaint form one parcel, and that the lands sought to be condemned constitute one portion of said entire parcel.

As conclusions of law, the court finds and decides:

That the plaintiff is entitled to the relief prayed for in said
59 amended complaint, and that a decree of condemnation should be entered herein; and that judgment be entered accordingly.

Dated this 1st day of April, 1896.

LUCIEN SHAW,
*Judge of the Superior Court.*

Endorsed: Filed Apr. 2, 1896. T. E. Newlin, clerk, by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Judgment.*

The above-entitled action, having come on regularly for trial before the court sitting without a jury as to all of the issues raised by the pleadings except the issues as to the amount of compensation to be paid to defendants, and the court having found upon all of said issues and made and filed its findings of fact and decision; and said issues as to the compensation to be paid to defendants having been tried before a jury of twelve persons regularly empaneled and sworn to try the case, and after evidence had been introduced on behalf of the respective parties, the jury retired to consider of their verdict, and subsequently returned into court, and, being called, answered to their names, and say they find the following verdict:

"We, the jury in the above-entitled action, find, as follows:

1. The value of an estate in fee-simple in the lands described in the complaint, including all their elements or value, subject to the paramount right of the City of Los Angeles to take from the Los Angeles river, from time to time, all the water that may be needed at such times for the use of the inhabitants of said city, and for all municipal and public uses and purposes therein, is the amount of $23,000.

2. The land described in the complaint constitutes only a part of a larger parcel, and the damages which will accrue to the
60 portion not sought to be condemned by reason of its severance from the portion sought to be condemned, and the construction of the improvements and works in the manner proposed by the plaintiff, amount to the sum of $2,000.

3. The portion of defendants' land not sought to be condemned will not, nor will any of it, be benefited by the construction of the improvement and works as proposed by plaintiff.

4. No property of the defendants will be benefited at all by any diversion by plaintiff or water from its natural course, nor by any distribution or delivery of water proposed to be made by plaintiff.

HORATIO N. RUST, *Foreman.*"

Wherefore, by reason of the law and of the findings and verdict aforesaid, it is ordered, adjudged and decreed that, upon payment by plaintiff to the defendants, or deposit in court for the defendants,

of the moneys hereinbefore mentioned as assessed as the value of the parcels of land hereinafter described, and for damages accruing to the remainder of the parcels of which said lands hereinafter described form part, amounting in the aggregate to the sum of twenty-five thousand dollars, within thirty days after this judgment, according to law, the plaintiff take the lands hereinafter particularly described for the public purposes mentioned in said complaint, and that the title in fee-simple to the said lands shall vest in and belong to the plaintiff, The City of Los Angeles, and that thereupon the said plaintiff shall become and be the owner in fee-simple of all of said lands.

And it is further ordered and adjudged that, if said moneys be not paid or deposited as aforesaid within thirty days from the date of this judgment, then that defendants have execution against plaintiff for the full amount thereof.

61 And it is further ordered, adjudged and decreed that, upon payment — deposit in court of all of said moneys within said period of thirty days, a final judgment or decree of condemnation of said lands be made and entered according to law.

And it is further ordered and adjudged that the plaintiff pay its costs and disbursements herein, and that the defendants have and recover of the plaintiff their proper costs and disbursements herein, amounting to the sum of $—

The following is a description of the lands hereinbefore referred to, to wit:—

All the estate, right, title and interest of said defendants, and each of them, of, in and to

All those tracts of land situate in the county of Los Angeles, State of California, and particularly described as follows:—

First tract. Beginning at station No. 22 of the Los Feliz rancho patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 85 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said ranch boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision, as shown on plat of, same, recorded in Book No. 17, pages 15 and 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00

62 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65, to a stake on the south side of Los Angeles river, from which point a

blazed live-oak tree, 30 inches in diameter, bears N. 73 deg. E. 73 links distant; also a second blazed live-oak tree, 26 inches in diameter, bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 31 deg. 24 min. E. 26.65 chains; thence N. 54 deg. 02 min. E. 27.90 chains to the place of beginning; containing 288.42 acres, more or less. The same being a portion of the Providencia Park tract.

Second tract. Beginning at the southwest corner of block 65 of the subdivision of the Providencia rancho and Scott tract; thence northerly along the westerly line of said block N. 22 deg. 15 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence S. 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning; containing 26.40 acres, more or less. The same being part of block 65 of the Providencia and Scott tract.

Thus done and signed the 1st day of April, A. D. 1896.

LUCIEN SHAW,
*Judge of the Superior Court.*

Endorsed: Filed Apr. 2, 1896. T. E. Newlin, clerk, by C. G. Keyes, deputy.

63 Docketed Apr. 2, 1896. Entered Apr. 2, 1896, Book 62, page 210. W. H. Whittemore, deputy clerk.

(Title of Court and Cause.)

*Defendants' Third Bill of Exceptions.*

Be it remembered, that heretofore the plaintiff filed its complaint in said action on the 8th day of June, 1893;

That thereafter and within the time required by law, the defendants made an appearance thereto and filed their demurrer to said complaint, and that said demurrer was thereafter argued and was ordered to be sustained, and that thereupon the plaintiff amended its said complaint, by consent of counsel for defendants and of the court, by interlining such amendment on the face of the original pleading as filed, and it was thereupon stipulated that said demurrer to the original complaint should be allowed to stand to said complaint as amended.

That thereafter, and before any argument upon said demurrer to said amended complaint was had, the plaintiff filed its amended complaint, being its second amended complaint, to which the defendants filed their demurrer on the 22d day of October, 1895; that thereafter the said demurrer was overruled and the said defendants answered in said action to said amended complaint;

That thereafter to wit, on the 18th day of March, 1896, the plaintiff, contrary to the objection of the defendants, was permitted to amend its second amended complaint as follows, to wit, by inserting after the word "that" and being the first word appearing in para-

graph VIII these words to wit: "subject to said rights of plaintiff to said waters of said Los Angeles river."

64 That the following is a copy of the said second amended complaint as same was amended by the insertion of the said last-named words, omitting therefrom the ordinance referred to in said complaint as Exhibit A and annexed thereto; the verification to said complaint, and the copy of the blue-print copy of the map referred to and made a part of said complaint as Exhibit B, to wit:

(Title of Court and Cause.)

The plaintiff above named, by this, its amended complaint, complains of the above-named defendants, and for cause of action alleges:

I.

That plaintiff is a municipal corporation in the State of California, organized and existing under the laws of said State.

II.

That the Los Angeles river is a non-navigable stream of water which rises in said county of Los Angeles, a few miles to the north and northwest of and above, and flows through said city of Los Angeles, and is fed by springs which rise to the surface in or adjoining the bed of said river.

That the bed of said river, from its source to the northern boundary of said city, is composed of sandy soil, into which the water sinks readily and forms subterranean streams, flowing in well-defined channels beneath said bed, which said subterranean water rises to the surface in various places before reaching said city, and becomes a part of the surface water of said river;

That said river flows through both of the tracts of land hereinafter described and sought to be condemned, before reaching said city.

III.

That the plaintiff is, and ever since its organization has been, the owner in fee-simple of the exclusive right to the use of all of the waters of said river from its source to the southern boundary

65 of said city in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, and of supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of plaintiff, and for other municipal uses in said city.

IV.

That plaintiff, since its organization, and within one year of and prior to the commencement of this action, has taken measures to inaugurate a plan and system of, and intends to construct water works by means of which it will divert the water of said river on the lands hereinafter described and sought to be condemned and conduct the same to said city for the purpose of supplying the in-

habitants of said city with water for domestic use, including the sprinkling of flower gardens and grass plots, and for the purpose of furnishing a supply of water for the sprinkling of streets and parks, flushing of sewers and extinguishment of fires and for other municipal uses in said city; which said plan and system include the acquisition of said lands hereinafter described and sought to be condemned.

That said last-mentioned water works are to be constructed, operated, owned and controlled by plaintiff, and the distribution of said water so to be diverted and conducted, to said city as aforesaid is also to be under the management and control of plaintiff.

V.

That, for the purpose of carrying out the said plan and system so inaugurated as aforesaid, after the organization of plaintiff and before the commencement of this action, to wit; on the 8th day of June, 1893, an ordinance of the mayor and council of said city was duly passed, made and adopted, a copy of which said ordinance is hereunto annexed, marked "Exhibit A," and the same is
66 hereby referred to and made a part hereof; which said ordinance is still in full force and effect.

VI.

That by said system and plan so inaugurated by plaintiff as aforesaid, the water of said river is to be diverted by plaintiff on said lands by means of a submerged dam or dams, tunnels, filtration galleries, collecting chambers, settling reservoirs or basins, and other means proper and necessary for the diversion of said water on said lands.

That the greater part of the water of said river flowing on the surface therein below and to the east of said lands come into said river beneath the surface at points adjoining the northern line of said lands, and that said subterranean water flowing beneath the surface of the bed of said river on said lands, is purer and more suitable to domestic use by the inhabitants in said city than the surface water of said river.

That the surface water of said river at all points above and below said lands is polluted to an extent which renders it liable to injure the health of the inhabitants of said city if used by them for domestic purposes.

That a large inhabited part of said city consists of hills so elevated as not to permit of the bringing of the water of said river thereon, unless the same be taken from a point as high up on said river as said lands; and that the water of said river could be conducted by gravity to nearly all of said hilly portions of said city if diverted from said river on said lands.

That the population of said city, at the time of the commencement of this action, was not less than 70,000, having increased since the year 1880 to that number from less than 12,000 inhabitants; and that said population is constantly increasing and said city is rapidly growing in extent of streets, parks, sewers and buildings, so

that the amount of water needed to supply the inhabitants
67 of said city for domestic purposes, including the sprinkling of flower gardens and grass plots, and to furnish water for the sprinkling of streets and parks, flushing of sewers and extinguishment of fires in said city, is fast increasing to an extent that at any time in the future the whole of the water of said river, within the boundaries of said lands sought to be condemned, may be needed for said purposes.

That the system of water works proposed to be constructed by plaintiff on said lands as aforesaid, is intended to be permanent for all future needs of said city for the purposes aforesaid, and the construction of said works will involve the expenditure by said city of several hundred thousand dollars.

That it is impossible to determine in advance of the construction of the same the places where said tunnels, filtration galleries, settling reservoirs or basins, and collecting chambers other than those delineated on the map attached hereto, should be constructed, and that it may be necessary in the construction of said works, to use all and every portion of said land.

That it will be necessary, for the purposes aforesaid, for plaintiff to construct on said lands sufficient collecting chambers, tunnels, filtration galleries, settling reservoirs or basins, submerged dams, and other works sufficient to divert all of the waters of said river on said lands; and that, for the purposes aforesaid, it will be necessary to, and plaintiff will, as soon as said lands are acquired by it, construct thereon the submerged dam, settling basins or reservoirs, filtration galleries and tunnels, designated on the map hereunto annexed, marked "Exhibit B," as "sub. dam," "settling basins," "main filtration gallery or tunnel," "lateral No. 1," "No. 2," "No. 3," and "No. 4," said terms, lateral "No. 1," "No. 2," "No. 3" and "No. 4,"
68 indicating the position of tunnels or filtration galleries connecting with said main gallery or tunnel.

That said river, from year to year, shifts and materially changes its course and bed on said lands, in such manner that one or more tunnels constructed on said lands at any particular point or points cannot always be relied on to intercept the water of said stream, and that, by reason of said facts, and of the necessity of plaintiff's being able to supply said water at all times, for said purposes, it may, at any time, be necessary for plaintiff to make an immediate extension of the tunnels, filtration galleries, collecting chambers, and other works, which may be constructed by it on said lands or to construct new ones thereon, without the delay which would ensue if the right to so extend said works or construct new ones on said lands had to be acquired by condemnation proceedings.

That said lands are better adapted and more suitable and proper for the construction thereon of said works, so proposed to be constructed by plaintiff as aforesaid, than any other lands on said river.

That there is no source of water supply owned by plaintiff excepting that from said river.

That it is necessary for the proper control, management and protection of said works, so proposed to be constructed by plaintiff on

said lands, as aforesaid, for plaintiff to acquire the fee-simple title to the whole of said lands, and that the public interest and necessity of said city demand the construction of said system of water works on said lands sought to be condemned herein, and that in order to properly construct and maintain the same, it is necessary that the whole of said lands should be condemned in fee-simple for the use of plaintiff.

VII.

69 That said lands consist of two separate tracts and are situate in the county of Los Angeles, State of California, and are particularly described as follows:

First tract. Beginning at station No. 22 of the Los Feliz Rancho Patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east, S. 85 deg. 15 min. E. 16.30 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said ranch boundary to a point on the north side of Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision, as shown on plat of same, recorded in Book No. 17, pages 15 and 18, miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W. 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65, Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65, to a stake on the south side of Los Angeles river, from which point a blazed live-oak tree 30 inches in diameter bears N. 73 deg. E. 73 links distant also a second blazed live-oak tree 26 inches in diameter bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg.

70 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 81 deg. 24 min. E. 26.65 chains; thence N. 54 deg. 02 min. E. 27.90 chains to the place of beginning, containing 288.43 acres, more or less, the same being a portion of the Providencia Park tract.

Second tract. Beginning at the southwest corner of block 65 of the subdivision of the Providencia rancho and Scott tract; thence northerly along the westerly line of said block N. 22 deg. 15 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13.00 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence S. 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning containing 26.40 acres,

more or less, the same being part of block 65 of the Providencia and Scott tract.

That a map or plat of said lands is hereunto annexed and marked "Exhibit B," showing the exterior boundaries of said above-described lands, and the location of said river, and of said submerged dam, settling basins or reservoirs, filtration galleries and tunnels, which are to be constructed thereon by plaintiff as aforesaid, which said map is hereby referred to and made a part hereof.

VIII.

That subject to said rights of plaintiff to said waters of said Los Angeles river, the defendant, J. D. Hooker, was, at the time of, and after the commencement of this action, the owner in fee-simple of the tract of land hereinbefore firstly described, and the defendant, A. E. Pomeroy, was, at the time of and after the commencement of this action, the owner in fee-simple of the tract of land secondly above described, and that both of said tracts of land are required for the construction, operation and maintenance of said
71 works, so proposed to be constructed by the plaintiff thereon as aforesaid.

That said firstly described tract of land includes only a part of an entire parcel, which entire parcel belonged, at and after the commencement of this action, to the defendant, J. D. Hooker, and is described as follows, to wit: the "Providencia Park tract," according to the map of the subdivision of the Providencia rancho, and Scott tract, recorded in said recorder's office in Book of Miscellaneous Records, pages 47 *et seq.*, containing 1,363.695 acres of land.

That said secondly described tract of land includes only a part of an entire parcel, which entire parcel belonged, at and after the commencement of this action, to the defendant, A. E. Pomeroy, and is described as follows, to wit: Said block number sixty-five (65,) of the said Providencia subdivision, according to the said map of said subdivision, recorded as aforesaid in Book 17 of Miscellaneous Records, pages 15, 16, 17 and 18, containing 70.13 acres.

That plaintiff owns no water works, by means of which water can be supplied to the inhabitants of said city for domestic use.

Wherefore, plaintiff prays judgment against the defendants and each of them, for the condemnation in fee-simple of all the estate, right, title and interest of said defendants and each of them, of and to each of said two tracts of land described in paragraph VII of this complaint, and of the whole thereof, and that, after the damages to the defendants and each of them, by reason of the taking of said property, shall have been estimated and ascertained, then said property be adjudged to vest in fee-simple in this plaintiff, and for
72 such other or further orders, judgments and decrees as may be reasonable or proper in the premises.

W. E. DUNN,
*City Attorney and Att'y for Plaintiff.*

LEE & SCOTT, *Of Counsel.*

Received copy of the within this 11 day of October, 1895. J. S. Chapman, att'y for def'ts.

Endorsed: Filed Oct. 11, 1895. T. E. Newlin, clerk; by A. W. Seaver, deputy.

To which order of the court, permitting the plaintiff to so amend, the defendants then and there excepted.

That thereafter and during the progress of the trial, to wit on the 24th day of March, 1896, the defendants filed their demurrer to the aforesaid complaint as amended, which demurrer was in the words, as follows:

73 In the Superior Court of the County of Los Angeles, State of California.

THE CITY OF LOS ANGELES (a Municipal Corporation), Plaintiff,
*vs.*
A. E. POMEROY and J. D. HOOKER, Defendants.
No. 19,680. Dept. No. 5.

Now come the defendants in the above-entitled action, and demur to the third amended complaint herein upon the *the* following grounds:

I.

That the said third amended complaint does not state facts sufficient to constitute a cause of action.

II.

The said third amended complaint is uncertain in this; it is uncertain what are the necessities that require the condem-
74 nation of the said tracts of land; uncertain as to what are the works to be constructed; uncertain as to what quantity of the land will need to be taken; uncertain as to the rights which the plaintiff claims to own in the waters of the Los Angeles river; uncertain as to what or for what reason or for what purpose, or for the construction of what works, the said tracts of land are required; uncertain that any portion of either of the said tracts is necessary for any purpose of the city plaintiff; uncertain that the said lands or any part thereof, or of either tract thereof is necessary for any purpose of the city; uncertain as to what is the estate that the defendants are admitted to own in the said land, and what estate in said lands is sought to be condemned; uncertain as to what property the defendants own, that it is necessary to condemn; uncertain as to what waters are claimed to constitute the Los Angeles river.

III.

Several causes of action are improperly united in the said third amended complaint in this; that a cause of action to determine rights in the waters of the Los Angeles river, and the waters perco-

lating beneath its bed claimed to be owned by the plaintiff and which claim is controverted by the defendants, is improperly united with an action to condemn for public use, property admitted to be owned by the defendants.

Wherefore defendants pray that the case be dismissed and that the defendants recover their costs.

JOHN G. NORTH,
R. H. F. VARIEL,
J. S. CHAPMAN,
*Attorneys for Defendants.*

Endorsed: No. 19680, dep't. 5; in the superior court of the State of California, in and for Los Angeles county; City of Los Angeles, plaintiff, *vs.*, Pomeroy and Hooker, defendants. Demurrer to
75 third amended complaint. Received copy of the within demurrer this 24th day of March, 1896, without waiver. Lee & Scott, attorneys for plaintiff. Filed March 24th, 1896. T. E. Newlin, clerk; by Sherman Smith, deputy.

That thereafter, to wit, on the 26th day of March, 1896, the above-entitled court made and entered an order overruling the said demurrer, to which order defendants excepted.

That thereupon an order was made directing that the said answer to said former amended complaint do stand as an answer to said complaint as amended.

Wherefore, defendants present this bill of exceptions, setting forth the above proceedings, with the ruling of the court thereon, and with the exceptions of the defendants thereto, and ask that the same be settled and signed by the judge of said court, who heard said demurrer, and that the same be filed as defendants' third bill of exceptions herein.

Dated March 27th, 1896.

JOHN S. CHAPMAN,
JOHN G. NORTH, AND
R. H. F. VARIEL,
*Attorneys for Defendants.*

The foregoing bill of exceptions is hereby settled and allowed this 4th day of April, 1896.

LUCIEN SHAW,
*Judge of the Superior Court.*

Endorsed: Filed Apr. 7, 1896. T. E. Newlin, clerk; by C. G. Keyes, deputy.

(Title of Court and Cause.)

*Notice of Appeal.*

You will please take notice that the defendants, A. E. Pomeroy and John D. Hooker, in the above-entitled action, hereby appeal to

the supreme court of this State, from the judgment of this
76 court therein given, made and entered, in the said superior court on the 2nd day of April, 1896, in favor of the plaintiff in said action and against said defendants and from the whole thereof.

Dated this 27th day of May, 1896.

JOHN S. CHAPMAN,
JOHN G. NORTH, AND
R. H. F. VARIEL,
*Attorneys for Defendants.*

To the clerk of the superior court and Will E. Dunn, and Lee & Scott, attorneys for plaintiff.

Endorsed: Filed May 29, 1896. T. E. Newlin, clerk; by C. G. Keyes, deputy.

Service of the within notice of appeal is hereby admitted this 29th day of May, 1896. W. E. Dunn, Lee and Scott, attorneys for pl't'ff.

*The Defendants' Proposed Bill of Exceptions to the Decision Herein.*

Be it remembered, that prior to the time set for the trial of this action, the defendants moved the court to continue the trial of the case until the issues of title to the property between the plaintiff and the defendants had been tried and determined, upon the ground that the court had no jurisdiction in this proceeding to determine controverted questions of title between the plaintiff and the defendants; and upon the further ground that other actions were pending, wherein were involved the title of the plaintiff and the defendants to the property sought to be condemned, and which motion was overruled by the court, and the defendants excepted, and their exceptions preserved in a bill of exceptions already settled and filed; and afterwards, on the 28th day of February, 1896, at the time set for the trial, the defendants, still insisting upon their objections and not waiving any objection that the questions of title could not
be tried in this proceeding, where the plaintiff in a con-
77 demnation suit is claiming rights and interests in the property owned by the defendants, and that the court had no jurisdiction to determine such questions, which objections had been overruled before, and the defendants, without waiving those objections, stipulated to proceed with the trial of the title before the judge.

That, before the commencement of the taking of evidence upon those subjects, the plaintiff asked leave of the court to amend the prayer of the complaint by interlining after the words, "for the condemnation in fee-simple of," the words, "all the estate, right, title*d* and interest of said defendants, and of each of them of and to;" before the said interlineation was made, the part of the complaint, so far as affected by the said amendment, was as follows: "Wherefore plaintiff prays judgment against the defendants, and each of them, for the condemnation in fee-simple of each of said

two tracts of land, described in paragraph VII of this complaint, and of the whole thereof, and that, after the damages to the defendants and each of them, by reason of the taking of said property, shall have been estimated and ascertained, then said property be adjudged to vest in fee-simple in this plaintiff;" after the said amendment was made, the prayer of the said amended complaint read as follows: "Wherefore plaintiff prays judgment against the defendants, and each of them, for the condemnation in fee-simple of all the estate, right, title and interest of said defendants, and of each of them, of and to each of said two tracts of land, described in paragraph VII of this complaint, and of the whole thereof," and then continues as before.

To the making of such amendment to the prayer of the said complaint, the defendants, and each of them, objected, which objection was overruled by the court, and the defendants, and each of them, then and there duly excepted.

78 The said amendment was then made by interlineation in the prayer of the said amended complaint. Thereupon, by leave of the court and stipulation of the counsel, the demurrer of the defendants, which had been interposed to the said second amended complaint, (the one which was thus amended) should be deemed as having been interposed to the complaint as it then stood after such amendment, and that the complaint should be considered in all respects as if it had been in its present form at the time of the interposing of the demurrer and of the ruling thereon, and it having been thus agreed by counsel and accepted by the court, and that the demurrer should be considered as filed to the complaint as thus amended, the court thereupon made an order overruling the demurrer to the said amended complaint, as thus amended.

Defendants stipulated that the answer filed to the said amended complaint as it existed before the last amendment, should stand as the answer to the complaint in its present form.

The trial then proceeded, and the counsel for the plaintiff offered in evidence a portion of the eighth paragraph of the answer which said portion was as follows:

"The defendants aver that the said waters have been used by the said plaintiff for one hundred years and more, and without detriment to the health of the people, and used for the said domestic purposes, as well as all other purposes." The defendants objected to that portion of the answer of the defendants, as evidence for the plaintiff, upon the ground that it was incompetent, and the court overruled the objection and the defendants excepted.

The plaintiff next offered in evidence a part of paragraph XII of the answer, which was as follows:

"That the altitude of said tracts was such that the said water
79 would flow into the city of Los Angeles, upon the elevated portions thereof by gravity, as well as to flow to other sections of the country to supply the land outside of the city with water for irrigation and domestic purposes and uses;" and which said paragraph was read as evidence, and thereupon the counsel for the defendants moved to strike out the first paragraph read, upon the

ground that it appeared from the reading of it that the whole clause in reference to the matters herein stated was not read, and that the whole was necessary to the understanding of the meaning of that which was read, and thereupon it was stipulated that the whole of paragraph VIII and XII of the answer should be considered as read in evidence by the plaintiff.

The plaintiff then introduced in evidence the patent of the United States Government to the city of Los Angeles, of date August 9th, 1866, and also the patent from the United States of America to the mayor and common council of the city of Los Angeles, of date the 4th of August, 1875, and recorded in Book 2, page 30, of Patents, in the office of the recorder of Los Angeles county. Copies of said patents, so far as necessary to any question here, are as follows:

"The United States of America to all to whom these presents shall come, Greeting:

"Whereas, it appears from a duly authenticated transcript filed in the General Land Office of the United States, that pursuant to the provisions of the act of Congress, approved on the third day of March, one thousand eight hundred and fifty-one, entitled 'An act to ascertain and settle private land claims in the State of California,' the mayor and common council of the city of Los Angeles filed their petition on the 26th day of October, anno Domini 1852, with the commissioners to ascertain and settle the private land claims in the State of California, sitting as a board in the city of Los An-
80 geles, in which petition they claimed the confirmation of title to a tract of land known as the city lands of Los Angeles, situated in the State of California. And, whereas, the board of land commissioners, aforesaid, on the 5th day of February, anno Domini one thousand eight hundred and fifty-six, in the cause entitled, 'The Mayor and Common Council of the City of Los Angeles *vs.* The United States,' rendered its decision as follows: In this case, on hearing the proofs and allegations, it is adjudged by the commission that the claim of the said petitioners is valid, for the land hereinafter particularly mentioned and described, and it is therefore decreed that the same be confirmed to them; and as to the remaining portion of the premises described and claimed by them in their petition to this commission, it is adjudged that their claim is invalid, and their application for confirmation thereof is rejected.

"The land of which confirmation is hereby made is situated 'in Los Angeles county, and contains four square leagues of land;' which decree or decision, having been taken by appeal to the district court of the United States for the southern district of California, and 'notice having been received from the Attorney General of the United States, that the appeal of the United States, in the cause entitled, "The Mayor and Common Council of the City of Los Angeles, appellants and appellees, *vs.* and *ads.*, The United States, appellees and appellants," "386 city lands, transcript 422," would not be prosecuted, and the appeal of the claimants from such part of the decision of the board of land commissioners as was adverse to their claim having been abandoned, and a stipulation having been en-

tered into between the U. S. district attorney and the attorney that both of said appeals may be dismissed.

"'It is ordered that the appeal of both parties in this
81 case from the decision of the United States board of land commissioners be and hereby are dismissed, and that the claimants may proceed under said decision as under a final decree,' whereby the proceedings of court upon title became final; and, whereas, under the 13th section of said act of the 3d March, A. D. 1851, and the supplemental legislation, and in accordance with the proceedings had pursuant to said act and supplemental legislation, there has been deposited in the General Land Office, a return with the descriptive notes, certificate of advertisement, and plat of the survey of said claim, confirmed as aforesaid, authenticated by the signature of the U. S. surveyor general for the State of California, which descriptive notes, certificate of advertisement and plat of survey are in the words and figures following, to wit:

"UNITED STATES SURVEYOR GENERAL'S OFFICE,
SAN FRANCISCO, CALIFORNIA.

"'Under and by virtue of the provisions of the 13th section of the act of Congress, of the 3d of March, 1851, entitled, "An act to ascertain and settle private land claims in the State of California," and of the 12th section of the act of Congress, approved on the 31st day of August, 1852, entitled, "An act making appropriations for the civil and diplomatic expenses of the Government, for the year ending the 30th of June, 1853, and for other purposes," and in consequence of a certificate of the United States district court for the southern district of California, of which a copy is annexed, having been filed in this office, whereby it appears that the Attorney General of the United States having given notice that it was not the intention of the United States to prosecute the appeal from the decision of the United States board of land commissioners, appointed under said act of March 3d, 1851, to ascertain and settle private land claims in the State of California, by which it recognized and confirmed the title and claim of the mayor and common council
82 of the city of Los Angeles to the tract of land designated as the city lands of Los Angeles,' the said appeal has been vacated, and thereby the said decision in favor of the said mayor and common council has become final.

"The said tract has been surveyed in conformity with the grant thereof and the said decision, and I do hereby certify the annexed map to be a true and accurate plat of the said tract of land as appears by the field-notes of the survey thereof made by Henry Hancock, deputy surveyor, in the month of September, 1858, under direction of this office, which, having been examined and approved, are now on file therein, and I do further certify, that under and by virtue of the said confirmation and survey the said mayor and common council of the city of Los Angeles, are entitled to a patent from the United States, upon presentation hereof to the General Land Office for the said tract of land, the same being bounded and described as follows, to wit: (Here follows a description by metes and

bounds of a tract of land embracing four square leagues in a square form, being 6 miles square, and the center of each of the boundaries being distant one league from the center of the plaza of the city of Los Angeles, and comprising all of the territory embraced in the city of Los Angeles according to the boundaries established by the charter of said city, adopted by the legislature January 31, 1889, except the south 420 yards; and excepting a triangular tract of about 500 acres bounded north by the north line of said city, on the west by the east bank of the Los Angeles river, and east by the Arroyo Seco, the apex of the triangle being the junction of said river with said Arroyo Seco.

In witness whereof, I have hereunto signed my name and caused the seal of the said office to be affixed this second day of July, A. D. 1859.

[SEAL.] J. W. MANDEVILLE,
*U. S. Surveyor General, California.*

83 U. S. SURVEYOR GENERAL'S OFFICE,
SAN FRANCISCO, *Nov.* 14, 1873.

I hereby certify that, by virtue of the provisions of the act of Congress, approved 1st of July, 1864, entitled 'An act to expedite the settlement of titles to lands in the State of California,' notice of the plat and survey having been made of the rancho city lands of Los Angeles, in Los Angeles county, finally confirmed to the mayor and common council of the city of Los Angeles, surveyed by Henry Hancock, U. S. deputy surveyor, in September, 1858, has been advertised in accordance therewith in two newspapers, to wit: the Los Angeles Express, published in the county of Los Angeles, State of California, being near to where the said land is located; the first publication being on the 18th day of July, 1873, and the last on the 8th day of August, 1873; also in the San Francisco Chronicle, a newspaper published in the city and county of San Francisco, State aforesaid; the first publication being on the 17th day of July, 1873, and the last on the 7th day of August, 1873, and that the plat of said survey has remained in this office subject to inspection during all of ninety days, and until expiration thereof from the date of the first publication.

In testimony whereof, I have hereunto signed my name officially, and caused my seal of office to be affixed, in the city of San Francisco, this 14th day of November, 1873.

[SEAL.] J. R. HARDENBURG,
*U. S. Surveyor General for California.*

U. S. SURVEYOR GENERAL'S OFFICE,
SAN FRANCISCO, *June* 18, 1874.

I hereby certify that the above and foregoing is a full, true and correct copy of the record of advertisement of the rancho city
84 lands of Los Angeles, as appears of record in my said office in records vol. 3, p. 563 of advertisements.

(Attest.) JAMES T. STRATTON,
*U. S. Surveyor General for California.*

(Here is attached the plat, whereon there appears the following certificates.)

A certificate by the U. S. surveyor general for California that said plat had been published in accordance with the act of Congress of June 14th, 1860, in the Los Angeles Star, a newspaper published in the city of Los Angeles, California, the first publication being on September 29th, 1860, and the last on October 20th, 1860, and also in a newspaper published nearest to the land, being the San Bernardino Herald, the first publication being September 27th, 1860, and the last October 16th, 1860; and that said plat had remained in his office, subject to inspection, from the date of the approval thereof.

Also a certificate of said surveyor general dated July 2d, 1859, that the field-notes from which said plat had been made out had been examined and approved, and were on file in his office.

Also the above certificate of advertisement of date November 14th, 1873.

Also a certificate of said surveyor general dated June 19th, 1874, that said plat was a full, true and correct copy of the original plat on file in his office.

Also the following endorsement: 'Approved August 4th, 1875. S. S. Burdett, Commissioner of the General Land Office.'

Now know ye, that the United States of America, in consideration of the premises and pursuant to the provisions of act of Congress aforesaid, of the 3d of March, anno Domini 1851, the legislation supplemental thereto, have given and granted, and by these presents do give and grant unto 'the mayor and common council of the city of Los Angeles,' and to their heirs, the tract of land embraced
85 and described in the foregoing survey, but with the stipulation, that in virtue of the 15th section of said act, neither the confirmation of this claim nor this patent shall affect the interests of third persons.

To have and to hold the said tract with the appurtenances unto the said 'the mayor and common council of the city of Los Angeles,' and to their heirs and assigns forever, with the stipulation aforesaid.

In testimony whereof, I, Ulysses S. Grant, President of the United States, have caused these letters to be made patent, and the seal of the General Land Office to be hereunto affixed.

Given under my hand at the city of Washington, this 4th day of August, in the year of our Lord, one thousand eight hundred and seventy-five, and of the Independence of the United States the one hundredth.

By the President.

[SEAL.]

U. S. GRANT,
By D. D. CONE, *Secretary*.
L. K. LIPPINCOTT,
*Recorder of the General Land Office*.

Recorder vol. 9, pp. 454 to 464 inclusive."

Said patent was recorded on July 6th, 1876, at 35 minutes past 10 o'clock a. m. in Book 2 of Patents, pages 30 *et seq.*, in the office of the county recorder of said Los Angeles county.

The United States of America to all to whom these presents shall come, Greeting:

Whereas, it appears from a duly authenticated transcript, filed in the General Land Office of the United States, that pursuant to the provisions of the act of Congress approved the third day of March, 1851, entitled, "An act to ascertain and settle private land
86 claims in the State of California," the mayor and common council of the city of Los Angeles, filed their petition on the 26th day of October, anno Domini, 1852, with the commissioners, to ascertain and settle the private land claims in the State of California, sitting as a board, in the city of Los Angeles, in which petition they claimed the confirmation of their title to a tract of land designated as the "City of Los Angeles," containing sixteen square leagues situated in the county of Los Angeles and State aforesaid, said claim being founded on a Mexican grant to the petitioners, made on the 25th day of August, 1844, by Manuel Micheltoreno, then governor of the department of Californias; and whereas, the board of land commissioners, aforesaid, on the 5th day of February, 1856, rendered a decree of confirmation as follows: "In this case on hearing the proofs and allegations, it is adjudged by the commission that the claim of the said petitioners is valid, for the land hereinafter particularly mentioned and described, it is therefore decreed that the same be confirmed to them; and as to the remaining portion of the premises described and claimed by them in their petition to this commission, it is adjudged that their claim is invalid, and their application for confirmation is therefore rejected."

"The land of which confirmation is hereby made, is situated in Los Angeles county, and contains four square leagues of land;" and the said decree or decision having been carried by appeal to the district court of the United States for the southern district of California, the following proceedings were had in the cause entitled:

"The Mayor and Common Council of the City of Los Angeles, appellants and appellees, *vs.* and *ads.* The United States, appellees and appellants."

"Notice having been received from the Attorney General of the United States that the appeal of the United States in this case
87 will not be prosecuted, and the appeal of the claimants from such part of the decision of the board of land commissioners as was adverse to their claim having been abandoned, and a stipulation having been entered into between the United States district attorney and the attorney that both of the appeals may be dismissed,

"It is ordered that the appeal- of both parties in this case from the decision of the United States board of land commissioners be, and hereby are, dismissed, and that the claimants may proceed under the said decision as under a final decree."

"And, whereas, under the thirteenth section of said act of March,

3d 1851, there have been presented to the Commissioner of the General Land Office, a plat and certificate of the survey of the tract of land confirmed as aforesaid, authenticated on the 2d day of July, A. D. 1859 by the signature of the surveyor general of the public lands in California, which plat and certificate are in the words and figures following, to wit: (Here follows the certificate of the U. S. surveyor general of date July 2, 1859, in foregoing patent of August 4th, 1875.)

(Here follows a plat of survey identical with that contained in the foregoing patent dated Aug. 4th, 1875, and whereon is endorsed a certificate of the U. S. surveyor general for California, dated July 2, 1859, that the field-notes from which said plat had been made out had been examined and approved, and were on file in his office.)

"Now know ye, that the United States of America, in consideration of the premises and pursuant to the provisions of act of Congress aforesaid of 3d March, 1851, have given and granted, and by these presents do give and grant unto the said mayor and common council of the city of Los Angeles, and to their successors in office, the tract of land embraced and described in the foregoing survey,
88 but with the stipulation that in virtue of the 15th section of the said act, the confirmation of this claim and this patent 'shall not affect the interests of third persons.'

"To have and to hold the said tract with the appurtenances unto the said mayor and common council of the city of Los Angeles forever, with the stipulation aforesaid.

"In testimony whereof I, Andrew Johnson, President of the United States, have caused these letters to be made patent and the seal of the General Land Office to be hereunto affixed.

"Given under my hand at the city of Washington this 9th day of August, in the year of our Lord one thousand eight hundred and sixty-six, and the Independence of the United States the ninety-first.

"By the President.

"[SEAL.] ANDREW JOHNSON,

"By EDW. D. NEIL, *Secretary.*

"MARTIN BUEL,

"*Acting Recorder of the General Land Office ad Interim.*

"Recorded vol. 6, pp. 144 to 150."

It was admitted that said patent was recorded in the proper record book of such patents in the U. S. General Land Office on the day of its date by the proper officer, and that said patent was recorded in the office of the county recorder on the 10th day of January, 1882.

The plaintiffs then offered in evidence a resolution of the city council, entered in volume 35 of the records of the city council, at page 615, which was as follows:

"Mr. Innes moves: 'Resolved, that it is the sense of the council of the city of Los Angeles that the city should own the water works supplying water to the inhabitants of the city.' Mr. Rees moves as

a substitute, 'That it is the sense of this council that the
89 question of supplying this city with a system of water works
be submitted to the people to vote upon as soon as possible.'
Which amendment was accepted and adopted." This resolution was of date May 23rd, 1892.

From the same volume and the same page and the same date, the plaintiff offered the following resolution: "Mr. Innes moves: 'Resolved, that plan number two as proposed by the city engineer in his report on the water system, is a reasonable, good plan for supplying the needs of the city now and in the future; and that the same be adopted as the system of supply for this city; and that the city engineer is hereby instructed to proceed at once to perfect the details of said plan, and report, in detail and with such changes and modifications as may be deemed desirable, to this council.' Which motion was adopted."

The said resolutions were admitted in evidence, and plaintiff next offered and introduced a resolution of date August 29th, 1892, and entered in volume 36 of the records of the council proceedings of said City of Los Angeles, at page 179. The entry was as follows: "The special committee on water supply.—Your special committee on water supply submit the report of the city engineer, and having made a careful examination of same, recommend its adoption and that the city attorney be instructed to present an ordinance, not later than Monday, September 5th, 1892, calling an election for the issuance of bonds for the construction of a water system to be owned and operated by the city. Which report was adopted."

Plaintiff next introduced from volume 36 of the same record, at page 235, and of date September 6th, 1892, the following: "The city attorney reported: 2nd. I have drawn and present herewith an ordinance of intention to call an election for the issuance of bonds for the
construction of a water system as directed by you. Also an ordi-
90 nance abandoning a portion of an alley in the Dana tract.
Draft of an ordinance determining that the public interest and necessity of the city of Los Angeles demands the construction of a system of water works to be owned and controlled by said city, the cost of which will be too great to be paid out of the ordinary annual income and revenue of said city; and that it is the intention of the city council to have such system of water works constructed, was read. On motion of Mr. Rhodes the rules were suspended, and, on motion of the same gentleman, said ordinance was then adopted by the council by the following vote: Ayes: Messrs. Alford, Innes, McGarry, Nickell, Rhodes, Rees, Summerland, Tufts and President Bonsall, 9; noes, none." This ordinance was recorded in Book 4 of Ordinances at page 333.

Plaintiff also introduced from volume 36 of the council records, page 275, and of date September 20th, 1892, the following: "The city engineer reported: 6th. 'I herewith submit plans and specifications for proposed new water supply for Los Angeles city, as recommended by special committee on water supply.' Which report was referred to the board of public works."

Plaintiff introduced from volume 36, at page 310, of date Septem-

ber 26th, 1892, the following: "The board of public works reported: 8th. 'We recommend the adoption of the plans and specifications submitted by the city engineer for the proposed new water supply.' Mr. Rees moves that Messrs. Percival, Culver and Meyer be requested to sit as a board of inspectors upon the plans presented by the city engineer for water system. Mr. Nickell moves as an amendment that the matter be referred to the committee of three in connection with the city engineer to investigate and report to the council as to the best method of procedure. Which amendment was adopted. Thereupon the original motion as amended was
91 adopted, and Messrs. Rhodes, Innes and President Bonsall were appointed as such committee, to which committee the city attorney was also added."

Plaintiff introduced from volume 36 of the same records, page 343, of date October 3rd, 1892, the following:

"The special committee on water-works plans reported. The undersigned committee to whom was referred the plans and specifications for the construction of a system of water works report as follows: In accordance with your instructions we have submitted these plans and specifications to a committee of engineers consisting of George Hansen, E. T. Wright, Fred W. Wood and Aug. Meyer, whose report to us is hereto attached. This committee having found that the system proposed is properly designed to ultimately supply the whole city with water, and the same system having been also approved at a meeting of engineers heretofore held in this city, we recommend that these plans and specifications be adopted by the council. Believing that the only solution of the water question is for the city to own and control its own system of water works and that there is an urgent necessity that this should be done as soon as possible, we recommend that the question of issuing bonds for this purpose be submitted to the people at an election to be held as soon as practicable. Which report was received and said plans and specifications adopted and ordered placed on file in the city clerk's office, by the following vote: Ayes, Messrs. Innes, McGarry, Nickell, Rhodes, Rees, Summerland, Tufts, President Bonsall, 8; noes, none."

The plaintiffs next introduced in evidence, from volume 36 of the same records, at page 365, and of date October 3rd, 1892, the following:

"The city attorney reported draft of an ordinance declaring the necessity of constructing a system of water works to be owned
92 and controlled by the city of Los Angeles, providing for the holding of a special election in the city of Los Angeles on November 2nd, 1892, for the purpose of voting for or against the issuing of bonds in the amount of $526,000 for the payment of the cost of the same, providing for the number and character of the bonds to be issued, dividing the city into election precincts, appointing polling places, inspectors, judges and clerks of election, and ordering the city clerk to publish notice of such special election, was read. On motion of Mr. Innes the rules were suspended, and on motion of the same gentleman said ordinance was then adopted by the council by the following vote: Ayes, Messrs. Alford, Innes,

McGarry, Nickell, Rhodes, Rees, Summerland, Tufts, President Bonsall, 9. Said ordinance will be found recorded in Book 1 of Ordinances at page 352."

The said ordinance was also introduced in evidence by the plaintiff, and of which a copy is hereinafter set forth.

This ordinance was introduced with the understanding that the proof of its publication would be made latter, at which time the defendants could object to the proof of publication.

Plaintiff then introduced in evidence from volume 38 of the same records, at page 60, and of date May 29th, 1893, being the minutes of the council of the city of Los Angeles the following:

*Report of the City Engineer.*

"GENTLEMEN: In order to construct and maintain the system of head works for the water-works system now contemplated by the city of Los Angeles, it will be necessary for the city to own and control the following-described real estate situate in the county of Los Angeles, State of California, and more particularly described as follows, to wit: Beginning at station No. 22 of the Los Feliz rancho patent boundary and running thence by true courses with magnetic variation of 14 deg. 30 min. east S. 85 deg. 15 min. E.
93 16.39 chains to station 21 of said rancho; thence N. 42 deg. E. 24.00 chains along said ranch boundary to a point on the north side of the Los Angeles river, said point being the southerly corner of block 80 of the Providencia subdivision; thence following the boundary line between the Providencia Park tract and the said Providencia subdivision to the southwesterly corner of block 65 of aforesaid subdivision, as shown on plat of same recorded in Book No. 17, pages 15 and 18 and Book 43, page 47 *et seq.* miscellaneous records of Los Angeles county, as follows, to wit: N. 75 deg. 45 min. W., 26.55 chains; thence N. 50 deg. W. 17.67 chains; thence N. 75 deg. 36 min. W. 5.60 chains; thence S. 75 deg. 43 min. W. 4.32 chains; thence S. 47 deg. 22 min. W. 4.14 chains; thence S. 15 deg. 20 min. W. 33.44 chains; thence S. 25 deg. 33 min. W. 6.00 chains; thence N. 79 deg. 48 min. W. 13.63 chains; thence N. 40 deg. 45 min. W. 13.23 chains; thence S. 80 deg. W. 20.52 chains; thence S. 49 deg. 30 min. W. 20.95 chains; thence S. 41 deg. 30 min. W. 22.72 chains to said southwest corner of block 65 Providencia subdivision; thence S. 22 deg. 15 min. E. 2.00 chains, being a continuation of the westerly line of said block 65 to a stake on the south side of the Los Angeles river from which point a blazed live-oak tree 30 inches in diameter bears N. 73 deg. E. 73 links distant; also a second blazed live-oak tree, 26 inches in diameter bears N. 65 deg. W. 50 links distant; thence N. 62 deg. 15 min. E. 23.66 chains to a stake on the summit of a conical hill; thence N. 56 deg. 19 min. E. 7.58 chains; thence S. 86 deg. 48 min. E. 23.50 chains; thence S. 47 deg. 55 min. E. 7.58 chains; thence N. 81 deg. 24 min. E. 26.65 chains; thence N. 54 deg. 02 min. E. 27.90 chains to the place of beginning, containing 288.42 acres, more or less.

"Second tract. The following-described real estate situate in the

county of Los Angeles, State of California, and more par-
94 ticularly described as follows, to wit: Beginning at the south-
west corner of block 65 of the subdivision of the Providencia subdivision; thence northerly along the westerly line of said block 65 N. 22 deg. 15 min. W. 18.79 chains; thence N. 67 deg. 45 min. E. 13 chains; thence S. 81 deg. 28 min. E. 8.60 chains; thence, S. 22 deg. 15 min. E. 4.32 chains to the S. E. corner of said block; thence S. 41 deg. 30 min. W. 22.72 chains to the place of beginning; containing 26.40 acres, more or less.

"And I therefore recommend that proceedings be instituted to acquire the same for the use of the city. Which report was adopted by the following vote: Ayes, Messrs. Campbell, Gaffey, Innes, Munson, Pessell, Rhodes Strohm and President Teed. Nays, none."

Plaintiff next introduced in evidence from volume 38 of the minutes of the council, at page 127, and of date June 8th, 1893, the following:

"The city attorney presented the draft of an ordinance authorizing the condemnation of certain land necessary for municipal purposes, which was read; and on motion of Mr. Munson the rules were suspended, and on motion of the same gentleman said ordinance was then adopted by the following vote: Ayes, Messrs. Campbell, Gaffey, Innes, Munson, Nickell, Rhodes, Strohm and President Teed, 8; noes, none. Said ordinance will be found of record in Book Number 5 of the records of ordinances, at page 192. Mr. Munson moved that the city clerk present this ordinance to the mayor for his approval forthwith. Which motion was adopted. Mr. Munson moved that when said last-mentioned ordinance shall have been approved by the mayor, the city attorney shall immediately commence proceedings in court for the condemnation of the land in question. Which motion was adopted."

95 Plaintiff next introduced in evidence, from the minutes of the council, volume 42, page 559, dated March 5th, 1895, the following:

"Draft of an ordinance determining that the public interest and necessity of the people of the city of Los Angeles demands the acquisition and improving of certain lands for the extension of certain public parks; also the acquisition of certain land upon which to construct head works for a water system for said city; also the acquisition of certain land and the erection of a central police station thereon; also the erection of a public museum and library building, the cost of which improvements and each of them will be too great to be paid out of the ordinary annual income and revenue of said city, and declaring the intention of the city council to have and procure said improvements to be made, was read. On motion of Mr Snyder the rules were suspended, and on motion of the same gentleman said ordinance was then adopted by the council by the following vote: Ayes, Messrs. Ashman, Blanchard, Kingery, Pessell, Snyder, Stockwell and President Teed; noes, none. Said ordinance will be found recorded in Book 3 of Ordinances, at page 91."

To the offer of this draft of an ordinance the defendants objected

upon the ground that it was more than two years after the action was commenced, and could be no authority for the commencement of the suit; but no objection was made to it as a part of the proof on the part of the city of the ability to make payment in case of condemnation, and it was admitted by the court simply for that purpose, and not as evidence of any authority to commence the action. For any other purpose than to show the ability of the city to buy water works the defendants' objection to it was sustained.

Plaintiff next offered in evidence the statute found in the Statutes of California of 1850, at page 155; also Statutes of 1852, pub-
96 lished in the statutes of that year, at page 186; also statutes of 1854, published in the statutes of that year, at page 205; also statute of 1874, published at page 312 of the statutes of that year; also from the statutes of 1874, statutes published at page 633; also from the statutes of 1875, the statute published at page 692; and from the statutes of 1877–'78, the statute published at page 643; and from the statutes of 1889, the statute published at page 502.

The defendants objected to the introduction of the statutes, upon the ground that they were incompetent, irrelevant, immaterial and unconstitutional; that in so far as they were law the court takes judicial notice of them, and in so far as they are anything else, they are simply void. The court overruled the objection and admitted them for the purpose of showing the succession of the present city of Los Angeles to the former pueblo under the Spanish and Mexican governments, to which ruling of the court admitting them for the purpose specified, the defendants excepted.

The plaintiff then offered in evidence the plan of pitic, as found in the transcript in the Baldwin case, to which the defendants made the following objections: That whatever the plan of pitic was, if it ever had any existence, and was the law of Spain or Mexico, and ever had any application to the pueblo of Los Angeles, or to any of these Mexican grants, they are, for the purpose of the preservation of rights of property that accrued under them, just as much a part of the law of California as the statutes of the legislature of California; and counsel said that they had no objection to the counsel for the plaintiff presenting them in any way that they think best and most convenient; only that the defendants do not admit that these papers are evidence in this case; that there was such a thing as the plan of pitic or what it was; that the court would take judicial
notice of it, and that if this which they offer is not the plan of
97 pitic, they did not want it understood that they were accepting it as a proof that it was. But, as a means of bringing before the court whatever they may think the plan of pitic, they did not object to it.

The COURT: Well, with that explanation it might be considered as read, at any rate, whether it is read in evidence.

COUNSEL FOR DEFENDANTS: We do not ask him to read them, any of them.

Mr. DUNN, counsel for the plaintiff: We offer it in evidence and let it be considered as read then.

The COURT: For the information of the court.

Translation of said plan of pitic as so introduced in evidence is hereinafter set forth under "sixth."

The plaintiff next introduced in evidence a deed from Griffith Jenkins Griffith to the City of Los Angeles, dated 30th of August, 1884, recorded in Book 131 of Deeds, at page 19.

Plaintiff then offered in evidence a deed from Griffith Jenkins Griffith, Hellman and Spence to the City of Los Angeles, recorded in Book 130 of Deeds, page 129.

These are the deeds under which the City of Los Angeles claims the water rights mentioned therein; and plaintiffs then offered in evidence the deed from Hellman and Spence, trustees, and Griffith Jenkins Griffith to the City of Los Angeles, dated 19th day of August, 1885, recorded in Book 144 of Deeds, at page 629.

The following is the substance of that deed, after stating the parties:

"Witnesseth: That whereas, Griffith Jenkins Griffith by his deed of August 30, A. D., 1884, sold and conveyed to the party of the second part (the City of Los Angeles) $\frac{5}{10}$ of all his right, title and interest in the waters of the Los Angeles river, the second deed being recorded upon page 19, volume 131, of Deeds, in the office of
98 the recorder of Los Angeles county, to which deed reference is hereby made, and the same made a part hereof;

"And, whereas, the said Griffith Jenkins Griffith, upon the 30th day of August, A. D., 1884, entered into an agreement with the party of the second part whereby he agreed to sell to said City of Los Angeles, party of the second part, all of his remaining interest, right and title in and to the water rights therein named, which agreement is recorded upon page 125 *et seq.*, volume 130 of Deeds, in the office of the recorder of Los Angeles county, to which agreement reference is hereby made, and the same made a part hereof; and,

"Whereas, in order to more effectually secure the fulfillment of the above-mentioned agreement the said Griffith Jenkins Griffith did make, execute and deliver his certain deed of trust, whereby he appointed I. W. Hellman and E. F. Spence his trustees to carry out and perform the trusts and covenants therein mentioned, which said deed of trust is recorded upon page 129 *et seq.*, of volume 130 of Deeds, in office of the county recorder of Los Angeles county, to which deed reference is hereby made and the same made a part hereof, and said Griffith thereby conveyed to said trustees all his remaining $\frac{5}{10}$ interest in and to the use of the waters of the Los Angeles river claimed as appurtenant to the Los Feliz rancho, and the remaining $\frac{5}{10}$ of interest which said Griffith had or claimed to have in the waters of the Los Angeles river for any purpose whatever upon said Los Feliz rancho, to be conveyed to the City of Los Angeles upon its compliance with the conditions precedent expressed in said deed; and,

"Whereas, the City of Los Angeles, party of the second part, has fully complied with the conditions precedent contained and expressed in said agreement and in said trust deed; now,

99 "Therefore, the parties of the first part, in consideration of the premises and of the sum of twenty-five thousand dollars by warrant upon the treasurer of the city of Los Angeles, the receipt whereof is hereby acknowledged by said Griffith Jenkins Griffith, do by these presents grant, bargain, sell, convey and confirm unto said party of the second part, its successors and assigns forever, all their remaining $\frac{5}{10}$ interest, right and title in and to the use of the water of the Los Angeles river appurtenant and claimed as appurtenant to said Los Feliz rancho, and all the remaining right and interest which said party of the first part has or claims to have to use any portion of the waters of said Los Angeles river for any purpose whatever on said Los Feliz rancho or elsewhere; also all rights that said Griffith Jenkins Griffith reserved to himself, his executors, administrators and assigns, under the deed made by him to the City of Los Angeles upon the 30th day of August, A. D., 1884, for the purpose of tapping the water ditches, flumes or pipes of party of the first part; and taking water therefrom for use of said rancho; and his right to convey said waters from said ditch, flume or pipe to and from the land of said rancho. The party of the first part reserves to said Griffith Jenkins Griffith and his assigns from this conveyance the right to develop water in any part of said ransho from sources other than the Los Angeles river by sinking wells, tunnelling or by other means, provided that such wells or development shall not interfere with or in any way or manner lessen or decrease the flow of the Los Angeles river or of any ditch, flume or pipe of said city of Los Angeles, and said Griffith Jenkins Griffith for himself, his executors, administrators and assigns, covenants and agrees that he will not by sinking wells, tunnelling or otherwise interfere with or lessen by percolation or otherwise the water of the Los Angeles river as aforesaid or the flow thereof.

100 and in further consideration of this conveyance the party of the second part covenants and agrees to construct, maintain and keep in good order for a period of two years from the 30th day of August, A. D., 1884, a number of wooden bridges across the canal and mentioned in the deed above mentioned. Said bridges shall not exceed eight in number, and shall be constructed at the places to be designated by said Griffith Jenkins Griffith, his executors, administrators or assigns, upon his or their demand after the execution and delivery of this deed. Said bridges not to be constructed after pipe shall be laid, but only during such time as said ditch or flume shall remain open or uncovered."

The rest of the said deed being the mere formal parts of the instrument. It was acknowledged 19th August, 1885, and recorded on the 19 of August, 1885, in Book 144, page 629 of deeds.

The substance of the deed of the 30th of August, 1884, recorded in Book 131 of Deeds, page 19, and before referred to, and being the deed from Griffith Jenkins Griffith to the City of Los Angeles, omitting the formal portion of the deed, is as follows:

"Witnesses, that the party of the first part (Griffith Jenkins Griffith), in consideration of the sum of twenty-five thousand dollars, this day to him in hand paid by the party of the second part

(the City of Los Angeles), the receipt whereof is hereby acknowledged, a warrant on the city treasurer of said city of Los Angeles having been accepted therefor by said party of the first part, doth grant, bargain, sell and convey to the said City of Los Angeles, party of the second part, and to its successors and assigns forever, $\frac{5}{10}$ of all his right, title and interest in and to the water of the Los Angeles river, which at the date of these presents are appurtenant to the Los Feliz rancho, situate in the said county of Los Angeles, and
101 now owned or claimed by said first party, and $\frac{5}{10}$ of all right which party of the first part has or claims to have to use any and all portions of the water of said Los Angeles river for any purpose whatever on said rancho or elsewhere, with no reservation to party of the first part whatever except as hereinafter expressly provided, together with a perpetual right of way over said strip of land fifty feet in width, to wit: forty feet in addition to the right of way ten feet wide, now owned by party of second part along the line of that certain ditch known as the city canal and reservoir ditch, throughout its entire length and extent on said rancho. The strip of land embraced in said right of way is more particularly described as follows:" Then follows a description of the fifty-foot strip clear across the Los Feliz rancho, where the ditch is now.

"Said right of way to be for the purposes of maintaining, repairing and improving said ditch, laying flumes or pipes therein, maintaining, repairing and improving the same perpetually. The party of the first part, however, reserves to himself a right of way over said strip of land last herein described for the purpose of tapping the water ditch, flume or pipe thereon through which water may be conducted from said Los Angeles river, and of taking therefrom for use on said rancho the remaining $\frac{5}{10}$ of all that part of the water of the Los Angeles river which at the date of these presents are appurtenant to said rancho, and to conduct the same from said ditch, flume or pipe to and upon said rancho; and he shall have the right to tap said ditch, flume or pipe for the aforesaid purpose; also to use such parts of said land over which said right of way is granted for such roads and crossings as may be found necessary for the purpose of said rancho; also the right to quarry stone and remove the same, and to cut and re-
move any or all trees growing on said strip of land
102 at such places as shall not interfere with or injure said ditch, flume or pipe, or hinder or obstruct said second party in the full and complete use and enjoyment of said strip of land for the purposes of a right of way as herein granted. Provided, that all reservations in this deed contained, except the right to quarry stone and chop wood on said forty-foot strip of land, are made subject to the contract between the same parties hereto, and of even date therewith. Said first party further hereby reserves to himself, his executors, administrators and assigns, the right to develop water from sources other than the Los Angeles river by sinking wells, tunneling or otherwise; provided that such development shall not interfere with or in any way lessen the flow of the waters

of said Los Angeles river, or any ditch, flume or pipe of said city of Los Angeles; and said first party for himself, his executors, administrators and assigns, covenants and agrees that he and they will not, by sinking wells, tunneling or otherwise, interfere with or lessen by percolation or otherwise the flow of the waters of the said Los Angeles river, or lessen the flow in said ditch, flume or pipe."

Counsel for the plaintiff here explained for the information of the court that this deed of August 30th, 1884, was a deed of Griffith Jenkins Griffith to the first half of the waters of the Los Feliz rancho, or any claim that they might have in the river, and at the same time the city took a contract for the other half, and a deed for the fifty-foot right of way clear across the rancho. The contract was fulfilled and all these reservations released by the owners of the ranch upon the fulfillment of the contract and the purchase of the other $\frac{5}{10}$, and all the reservations were contained in the final deed, the substance of which has hereinbefore been set forth.

103 The following conversation then occurred between the counsel:

Mr. DUNN, attorney for the city (addressing the counsel for the defendants): "Will you admit that at the time of giving these deeds and making these agreements Griffith Jenkins Griffith was the owner of the property which was conveyed by the instruments?"

Mr. CHAPMAN, for the defendants: "We admit he was the owner of the tract of land in the Los Feliz over which that right of way was granted, and also owned the water rights which he purported there to convey."

Mr. DUNN: No, sir, we don't care——"

Mr. SCOTT, for plaintiff: "They admit that, but we don't."

Mr. VARIEL, for defendants: "And also the rights that he reserved."

Mr. SCOTT: "We don't admit that he owned the rights to the water."

Mr. DUNN: "Yes. That is all."

The COURT: "What is admitted now? I suppose what you want to admit is that he had title, derived from the patents, to that portion of the Los Feliz ranch described in the deeds."

Mr. CHAPMAN: "And the water ditches which had been used on the Los Feliz ranch, so far as they were on the ranch; and that he had been using water there, he and his predecessors; and that he granted whatever water rights he did have. And we admit that he had some water rights, and they don't, I believe; but we say he did have some, and he granted them to the city by this deed."

Mr. DUNN: "We don't care for any admission at all, except that he was the owner of this portion of the Los Feliz rancho over which this right of way extends."

The COURT: "And he had whatever title he did, derived from the United States patent?"

104 Mr. DUNN: "Yes sir."

Mr. CHAPMAN: "Yes sir, through the patent to the Los Feliz rancho. And, in addition to that, as was decided by the Supreme Court in the suit of Baldwin against the City of Lo

Angeles, Baldwin had appropriated and used a quantity of water there. What the quantity was I don't just remember. And that was all conveyed by Baldwin to Griffith Jenkins Griffith, whatever he had."

Mr. SCOTT: "Of course the decision of the Supreme Court speaks for itself in that regard."

The COURT: "What relevancy has the right that Baldwin had in the river there to this action? I can't see."

Mr. SCOTT: "I suppose it is to show our right to the water there; that we have acquired that right."

The COURT: "Unless he had some rights that he had a right to enforce against the upper proprietor different from and in addition to the rights which any other riparian proprietor has, I don't see the city got anything against Pomeroy and Hooker. What you want to stipulate now is that Griffith had the title that he attempted to convey."

Mr. SCOTT: "Yes sir: to the land."

The COURT: "That is what I say. And whether he had any peculiar, special rights in water more than a riparian owner and land-owner would have, I don't understand you agree upon that at all."

Mr. SCOTT: "I suppose what they were after, this Los Feliz rancho, was a Mexican grant, which was confirmed by the American Government, and the patent was issued. And then this title that came down to Griffith Jenkins Griffith came through numerous conveyances, which it is not worth while to introduce here, because we agree that he got them."

The COURT: "That is the point."

Mr. CHAPMAN: "Yes sir."

105 Mr. SCOTT: "And that that land did front upon the river for a considerable distance."

Mr. CHAPMAN: "Yes sir."

Mr. CHAPMAN: "Yes sir, for a good ways."

And then it was further stipulated that the Los Feliz rancho does come down to the north boundary of the city, as it now appears, independently of the recent additions to the city, but that it does not follow the line of the river all the way down, that there is a small tract at the southeast corner that is not on the river, and in several places between the north boundary of the city and the Providencia rancho, the Los Feliz extends clear across and runs on both sides of the river. And the San Rafael and the Providencia and Los Feliz ranchos all corner together.

Plaintiff next introduced in evidence the records in the case number 4303 of the superior court, an action brought by the City of Los Angeles against Griffith Jenkins Griffith, the complaint being filed August 19th, 1885. It was an action to quiet title, and in the complaint it was alleged that the plaintiff was a municipal corporation, and was the owner of and in possession of the waters of the Los Angeles river, and entitled to the full and free use and enjoyment of all waters flowing in said river, and in all the ditches connecting with said river and the springs and sources from whence the waters

flowing in said ditches are derived, and the full, free and exclusive use of all water in said river, and the right to regulate and control the disposition of the same; that the defendant claims an interest adverse and the claim was without right, and asking that the plaintiff's title *me* quieted. There was a decree in favor of the plaintiff.

The defendants objected to the introduction of this record as incompetent to affect any right of the defendants, they not being parties to the action.

Mr. DUNN said: "These defendants weren't parties to the
106 action, and no one interested in their land were parties to the action. We don't claim they are bound by it in that way at all. It is one of the evidences of the city's title."

Mr. CHAPMAN: "As against Griffith Jenkins Griffith?"

The COURT: "Well, there is no objection to the record, as I understand it, for the purpose for which it is offered."

Mr. CHAPMAN: "As a muniment of title."

Mr. VARIEL: "We want to make this exception: We object to it as any evidence whatever of any title in the city whatever to any waters other than the mere surface waters of the river."

The COURT: "Well, you are inclined to make an argument as to the legal effect——"

Mr. DUNN: "We will offer it for all purposes; for what it is worth."

The COURT: "If it has any effect it will have it."

Mr. VARIEL: "Well, we object to it as irrelevant, incompetent and immaterial."

The COURT: "It is already in."

Mr. VARIEL: "On the further ground that the defendants were not parties to the action, that it cannot be an estoppel against them."

The COURT: "Well, I will decline to receive any objections after the testimony is in."

Mr. VARIEL: "Note an exception."

It appeared in the record of the said action, that on August 19th, 1885, the defendant filed a disclaimer.

The stipulation in regard to the introduction of the papers in the Baldwin suit, of which the plan of pitic was one, was brought up again on the 28th of February, and Mr. Chapman said:

"I tried to express myself clearly this morning, that as to your plan of pitic and all laws, rules and regulations of the Spanish or Mexican governments that entered into and formed a part of
107 the rights of property of people in this country pueblos or anything else, are, for the purpose of sustaining those rights, parts of the laws of the State of California, and that the court takes judicial notice of them just as it will of an act of the legislature, and while we all presume that the court has within its breast all the laws of California, we know that it has not, but when the court wants to know what it is it applies to such sources as it sees fit for the purpose of ascertaining. I have no objections to the plan of pitic from the Baldwin transcript, nor any other paper of the like character, or in the Baldwin transcript at all. I don't

object to it as not being a copy. I only say that it cannot control the knowledge that is supposed to be in the breast of the judge, and that if it should not be correct and the judge knows it, or it is brought to his information in any way, it stands upon exactly the same footing as though he produced a printed volume of the statutes here and we could produce the enrolled bill to show that it was not correct, that we would have the right to do it."

The COURT: "I understand that to be the substance of what was said this morning."

Mr. SCOTT: "That is satisfactory."

The COURT: "The court may resort to appropriate books or documents of reference for the purpose of aiding its official knowledge."

Mr. CHAPMAN: "Yes sir. Your honor can go anywhere you please. If they present these papers and they don't satisfy you that such is the law, you can go to any other place, to any treatise, or the law or anything else."

Plaintiff then next introduced in evidence from the transcript in the case of the City of Los Angeles against Baldwin, in the district court of the 17th judicial district of the State of California, in and for the county of Los Angeles, from page 31 of the transcript.

First. Communication from the commandant general of
108 the Californias to Don Fernando de Rivera y Moncada, concerning the occupation of the channel of Santa Barbara and the erection of the town of Los Angeles, in the year 1779.

Provincial State Papers, vol. II, 1778–1780, p. 393—

Recites the determination of the government to found a pueblo with the name of "Reyna de Los Angeles" on the river of the Porciuncula.

By authority of the governor, Don Phelipe Neve, directs said Rivera to carry out said determination under the following instructions:

To settle said pueblos with families and soldiers told off from the garrisons, in order to increase the population of the province and for the special purpose of stock-raising.

Dated Dec. 27, 1779.

(Duly signed and authenticated.)

Second. Communication from the commandant general to Governor Neve, empowering him to establish the fort at Santa Barbara and the two pueblos, dated 22 September, 1780.

Provincial State Papers, vol. II, 1778–1780, p. 521.

Directs the governor, Neve, to establish the presid-o of Santa Barbara and the two pueblos, (one of which is Los Angeles), with a view to land and water for cultivation, so that the general expenses of the government may be paid by these and similar establishments.

(Duly signed and authenticated.)

Third. Communication from the governor of the Californias to the viceroy concerning the establishment of San Jose and Los Angeles, dated 1775 to 1790, (exact date not given in translation).

Provincial Records, vol. I, 1775 to 1790, p. 20, No. 109.

Refers to previous orders in regard to the founding of two pueblos

on the Rivers Guadalupe and Porciuncula respectively, on account of the ffertility of the soil and the abundance of water for ir-
109 rigation. Refers to the importance of the enterprises in order to render the province independent in the matter of rain supply.

Recites that he had assigned to the settlement of San José de Galves on the Guadalupe river, nine soldiers and two recruits, with their families—skillful laborers—and had given to each settler, besides the lot on which his house was situated, certain lands sufficient for the sowing of one fanega of corn, together with well-broken horses, flocks of every kind, utensils, etc.

(Duly signed and authenticated.)

Fourth. Communication from the commandant general to the governor of the Californias concerning the establishment of the towns of San José and Los Angeles.

Dated 1775 to 1790, (exact date not given in the translation.)

Provincial Records, vol. I, 1775–1790, page 17, No. 7.

Refers to the two places existing in the provence between San Diego and San Francisco, with facilities for irrigation, for cultivation and agriculture. That one of these places is near the river of the Porciuncula, 42 leagues from San Diego, and 2 leagues from the Mission San Gabriel, the other being on the Guadalupe river. Recites his desire to found pu*e*blos at these points in order to furnish grain for the three presidios of the province. Recites his selection of nine soldiers practised in agriculture, and five farmers, with their families, for each of said pueblos.

Recites the setting apart by him to each settler, besides the lot (solares) on which he erected his house, certain irrigable lands for the planting of one "fanega" of corn, with horses and cattle of all kinds, and tools, etc.

Fifth. Decree of Governor Don Phelipe de Neve for the establishment of the pueblo of Los Angeles.

110 Dated 20 August, 1781.

State Papers, vol. I, Missions and Colonizations, p. 416. Provides that for the foundation of the Pueblo "La Reyna de Los Angeles" in the immediate vicinity of the river of the Porciuncula, all the lands capable of irrigation, should be carefully examined, and that point selected for the erection of a dam which would insure the distribution of the water to the greater portion of the lands.

That the site of the town should be chosen on elevated ground so as to enjoy the north and south winds, and to avoid the risks of inundations, but as near the river and main ditch as possible.

Provides for a public square (plaza), streets, etc., and for the division of all arable lands into plots or lots. Each tract (or suerte) shall contain 200 varas in length by two hundred varas in width, which is the space generally required for the planting and raising of a "fanega" of corn. All building lots or arable tracts shall be distributed and assigned in the name of the king, reserving to the Crown one-fourth of the arable and dry lands for the benefit of new settlers, assigning also certain plots or tracts as the property of the pueblo.

Provides for the demarcation of lots and tracts.

(Duly signed and authenticated.)

Sixth. Plan of Pitic.

Dated November 14, 1783.

Cal. Archieves, vol. I, Missions and Colonization, pages 853, etc.

Instructions approved by his majesty and made for the establishing of the new town of Pitic in the province of Sonora, and ordered to be adopted by the other new projected settlements, and by those that may be established in the district of the general commandancy.

Sec. 6 provides that within the 4 leagues assigned as the limits of each pueblo, all pastures, woods, water privileges, hunting, fishing, stone quarries, fruit trees, and other privileges shall be
111 for the common use and benefit of the Spaniards and Indians residing therein, and in its suburbs or villages, (de los Seris), etc.

Sec. 7 provides that the residents and natives shall enjoy equally the woods, pastures, water privileges, and other advantages of the royal and vacant lands that may be outside of the land assigned to the new settlement, in common with the resident- and natives of the adjoining and neighboring pueblos, which privilege is to be enjoyed subject to his majesty's orders.

Sec. 19. The advantage of irrigation being the principal means of fertilizing the lands, and the most conducive to the increase of the settlement, the commissioner shall take particular care to distribute the waters so that all the land that may be irrigable might partake of them, especially at the season of spring and summer, when they are most necessary to the cultivated land in order to insure the crops. For which purpose directs that the territory be divided into districts, (partidos), or hereditaments marking out to each one a trench or ditch starting from the main source, by which the quantity of water can be regulated in accordance with the needs of each settler throughout the different seasons of the years, so that each settler shall know the ditch on which he is to depend and shall be restricted to its use, and to a certain quantity of water, so that those below him may not be injured.

Sec. 20 provides for the appointment of one alcalde (or manador) to each trench or ditch, who shall have the charge of the distribution of the waters, and who shall also cause such lands as the owners may neglect, to be irrigated at the expense of the owners.

Sec. 24. The ayuntamiento is vested with the power and authority to make, promulgate and enforce all necessary laws, rules and
112 regulations, not contrary to the general laws for the government of the settlement.

(Duly signed and authenticated.)

Seventh. Opinion of the attorney (assessor) of the commandency on the subject of the concession of land, &c., and remission of the said opinion by the commandant general to the governor.

State Papers, vol. I, Missions and Colonizations, pages 808, etc.

To the hon. commandant general.

Recites title 14, article 8, of the instructions which treat of the

political government, &c., of California and the regulations of that peninsula, approved by his majesty 24 Oct., 1781—which directs that the new settlers shall enjoy, for the maintenance of their stock, the common advantage of waters and pastures, wood and timber of the common (exido) forests and pasture grounds (dehesas) which in compliance with the laws are to be marked out for every pueblo, and that besides, each settler shall enjoy privately the pastures of his own land, limiting each settler to fifty head of each kind of cattle, &c.

Recites 5th. Law of title, 17, Liber 4 of the "Recopilacion" for the territories, which provides that the use of the grazing lands (pastos) wood and waters of the provinces of the Indies shall be common to all the residents thereof, that they may enjoy them freely with their cattle, and that the right of pasture, &c., refers also to cultivated lands after the harvest has been gathered.

The allot-ing of tracts of land for cattle (sitios) claimed by settlers in California, and proposed by the governor in his communication of Nov. 20, 1784, cannot, nor should it, be made within the boundaries assigned to each pueblo, which in conformity to law 6, title 5, Liber 5, of the "Recopilacion" must be four leagues of land in a square or oblong body, according to the nature of the
113 ground, because otherwise they would become private owners of forests, water, timber, wood and other advantages, so depriving their neighbors of these benefits, which is plainly at variance with the intention of the before-mentioned laws and the express provisions of article 8, of the instructions for settlements (poblaciones) in the Californias, according to which all the waters, pastures, wood and timber within the limits of each pueblo, must be for the common advantage, so that all the new settlers may enjoy and partake of them, maintaining thereon their cattle and participating of the other benefits that might be produced.

Recites laws 1 to 13, title 12 of the same Liber 4, by which the distribution and allot-ing of peonias, cavalerias and sitios, for tracts "de Ganados Mayores y Menores" is permitted, provided they be given far from the Indian villages and their cultivated fields, and requiring the owners of cattle, &c., to employ herders to keep their cattle from doing damage, &c.

Recites that owing to the great extent of pastures, &c., the chief wealth of the pueblos must consist in rearing an increase of cattle, &c., and for these reasons he recommends that the commandant general order the governor of the Californias, Don Pedro Fages, that he allot to each new "poblacion" four leagues of land, in a square or oblong body, as the nature of the ground will admit and that he shall not concede or grant any portion thereof for farms for the raising of cattle, in order that the woods, pastures, waters and other benefits be left in common for all the residents and settlers without any exercise of private domain or property therein. And that he grant, outside of the limits of the pueblos, and at a distance from the pueblos, missions and Indian villages, "sitios" for farms and tracts for raising cattle, obliging the settlers to employ sufficient herdsmen, etc., to prevent damages, each settler to have no more

than three "sitios," and to have at least thereon 2,000 head
114 of cattle, and that notwithstanding his concessions the pastures shall remain for the common advantage, and that where there are no herds of cattle, concessions may be granted for the raising of sugar cane, etc.

(Duly signed and authenticated.)

Under date of 21 June, 1786, Jacabo Ugarte y Loyola, commandant general, transmits the above report to Senor Don Pedro Fages, governor, with instructions to make grants of land agreeably to the terms of said report. (See paper No. 919.)

Eighth. Order of Don Pedro Fages, lieutenant colonel, etc., governor of the peninsula of California, as to the distribution of the lands to the settlers of Los Angeles, dated August 14th, 1786.

State Papers, vol. 1, Missions and Colonizations, pages 710, etc.

Recites title 14 of the royal decree for the government of this peninsula, providing the methods by which the lots and tracts of irrigable and dry lands are to be distributed, and the rules governing the raising of stock and cultivation of lands, etc., and to the end that the settlers near the pueblo of "Our Lady of the Angels" (Los Angeles) may live in quiet and peace, commissions the ensign (alferez) Don Jose Arguello from the presidio of Santa Barbara to proceed to Los Angeles and give formal possession to settlers in accordance with the terms of said royal decree, of the lots and tracts of land heretofore assigned to them.

That he should clearly define and designate what are public domains, viz: water, pasture, wood, etc.; the settlers to accept their farms, etc., under this understanding, and to sign instruments to that effect. All of which is to be recorded in the "Libro Meatro" of each settlement and also in the records of the presidio of Santa Barbara.

(Duly signed and authenticated.)

115 Ninth. Report of the commissioner, Don Jose Arguello as to his action in assigning and marking out lands for private settlers and for the king of the pueblo of Los Angeles, dated 5th September, 1786.

State Papers, vol. I, Missions and Colonizations, page 729.

Reports that, having confirmed to each settler his respective lots and tracts of land, he then proceeded with them and his assistants to measure the lands still unassigned, which unassigned lands he reserved for the Crown, assigning them for the common use of the settlers for pasture and keeping their stock, with the common right in all the waters, wood and timber, etc. All of which he explained to the settlers, and to which they assented, signing their names or making the sign of the cross.

(Duly signed and authenticated.)

On the 18th Sept., 1786, the said commissioner, Don Jose Arguello transmits the foregoing report to the commandant general, certifying that all the proceedings had first been duly recorded in the "Libro Maestro" of the town and in the books at the presidio of Santa Barbara.

(Duly signed and authenticated.)

Tenth. Order of the commandant general for the direction of captains and commandants in the distribution of lands in the pueblo of Los Angeles.

Dated 22 October, 1791.

State Papers, vol. I, Missions and Colonizations, page 850.

Recites opinion of the attorney (assessor) of the commandancy and authorizes the captains of presidios to grant and distribute house lots and lands to soldiers and citizens. Fixes the limit of the new pueblos at 4 leagues—and directs that said captains and commandants shall not grant lands to private parties outside of said limits, leaving the royal haciendas outside of said limits free and open, &c.

(Duly signed and authenticated.)

116 Eleventh. Communication of the commandant general in regard to the same matter, (viz: the distribution of lands within the limits of the town of Los Angeles.)

Dated 19th January, 1793.

State Papers, vol. I, Missions and Colonizations, page 804.

Recites the approval by the viceroy at a superior meeting of the royal exchequer, of the foregoing order of 22 October, 1791, and the captains of presidios should continue to make grants of lands within the 4 leagues allotted to pueblos, to settlers, &c., but not beyond said limits.

Recites the result of a conference with said captains of presidios on the subject, which resulted in an order to them to cease said grants and distributions—in conformity with articles 7, 81 and 306 of the Ordinance of Intendantes—and article 1, title II, of the Presidio Laws—because said laws give the "intendantes" full power and jurisdiction, and a conflict of authority would arise, &c.

Directs that this order be promulgated among the captains and commandants.

(Duly signed and authenticated.)

Twelfth. "Expediente" concerning the injury done to the pueblo of Los Angeles by the erection of dam on the Cahuenga ranch by the priests of the mission of San Fernando, whereby the waters of the river of Los Angeles was diverted, &c.

1810.

Provincial State Papers, vol. XIX, 1805-1815, pages 956, *et seq.*

No. 1.

Under date of 17 Feb., 1810, Xavier Alvarado, sergeant, reports to Jose Arguello, commandante of Santa Barbara, that complaint has been made to him by certain citizens of Los Angeles that the R. R. F. F. of San Fernando have made a dam on the Cahuenga rancho, cutting off the waters of the river from which the

117 town is provided, and that in consideration of the injury done to the town he sent a commission to examine into the matter which made a report fully confirming the substance of the complaint.

(Duly signed and authenticated.)

No. 2.

Communication from commandant of Santa Barbara to R. R. F. F., minister of the mission of San Fernando.

Dated Feb. 20, 1810.

Recites the foregoing complaint made by the citizens of Los Angeles as to the erection of a dam on the river of the Porciuncula in the Cahuenga, and the damage it will cause to the farmers and other laborers (otros faenas) of said pueblo, as it is the only water that supports them. Announces that he has appointed a commission to consult with him in the matter, and hopes thereby to avoid appeal to the superior authority.

(Duly signed and authenticated.)

No. 3.

Under date of 20 February, 1810, the commandant, Jose Arguello, encloses the foregoing communication No. 2 to the sergeant, Alvarado, with instructions to deliver it to the R. R. F. F. of San Fernando and demand that the dam should be removed—and directs an immediate report.

(Duly signed and authenticated.)

Nos. 4, 5, 6 and 7 contain further communications, reports and evidence on this subject. The authorities of the pueblo produce evidence to show that the dam cuts off the source of our waters for irrigation," thereby causing and threatening great damage and suffering." The authorities of the mission deny this; and claim that the dam they use had been used by a former occupant for fourteen years, but they yield all right to the same, and only ask permission to use sufficient water for irrigating a small tract of land necessary for the mission "with the precise understanding that in
118 whatever time the least damage should be proved and caused to the settlers on account of the diminution of water by us, the mission will cease its labors in the place," and in the meantime agree to return all the water to the river after having used it for irrigation.

Under date of March 26, 1810, Jose Arguello, commandant, &c., forwards the "expediente" in the case to the governor, de Arrillaga, under his official hand and seal.

Thirteenth. "Notice" addressed to the governor of the province showing the land and boundaries of the town of Los Angeles.

Dated September 8th, 1817.

This "notice" concludes as follows: "It being understood that the ranchos of Antonio Maria Lugo and Francisco Feliz remain within the town."

(Duly signed and authenticated.)

Fourteenth. Order of Governor Manuel Jimeno declaring the dissolution of the "illustrious corporation" (ayuntamiento) of Los Angeles—on account of the paucity of inhabitants, under the law of March 20, 1837.

Dated Nov. 7, 1839.

(Duly signed and authenticated.)

Departmental state papers—Los Angeles, official correspondence, page 225.

Fifteenth. Communication from the governor to the prefect of the second district.

Departmental state papers—Los Angeles, official correspondence, page 263, *et seq.*

Under date of Dec. 22, 1839, the governor informs the prefect that the ayuntamiento of Los Angeles has been dissolved.

Makes special provision as to the care and collections of government funds, &c.

(Duly signed and authenticated.)

Sixteenth. Official record of a meeting of the departmental assembly held at Monterey, Feb. 16th, 1840.

119 Legislative Records, vol. III, 1836–1840, page 338.

At this mee-ing the governor, Manuel Jimeno, submitted a "statement of the actual condition of the public administration of the department."

Under the head of "Ayuntamientos" he reports that "there is no ayuntamiento whatever in the department, for there being no competent number of inhabitants in any of the towns as provided by the constitution, those then existing had to be dissolved."

(Duly signed and authenticated.)

Seventeenth. Proclamation by Manuel Micheltorena, governor, as to the re-establishment and election of "ayuntamientos."

Dated November 14, 1843.

Recites the insufficiency of the justices of the peace heretofore appointed to exercise the duties and functions of the ayuntamientos, and directs elections to be had in the towns of Monterey and Los Angeles of ayuntamientos, to consist of one first alcalde, one second alcalde, four regidores and one syndice—said elections to be held on second Sunday of the coming December.

(Duly signed and authenticated.)

Eighteenth. "Expediente" in regard to the measurement and laying out of the common lands of the city of Los Angeles.

A. D. 1846.

The effect of the papers contained in this "expediente" is to confirm and legalize the action of the previously appointed commission in laying out and assigning as the commons of the city, two leagues from the plaza in the direction of each of the "four cardinal winds." In pursuance of which the governor orders "the placing of the usual landmarks in a stable and durable manner with the object of assuring the land proper to the municipality."

(Duly signed and authenticated.)

Nineteenth. "Expediente" in the matter of the grant of
120 the Providencia rancho, lying between Cahuenga and Rancho de Berdugo, to Vicente de la Osa.

A. D. 1843.

(No. 426, in surveyor general'- office.)

Under date of August 1st, 1842, Vicente de la Osa petitions the prefect of the 2d district for a grant of land (now included in the Providencia ranch).

Alleges the damage, suffering and losses to his small number of stock, his only property, by reason of not having a proper place where to keep them.

That the land desired by him is at present unoccupied, and his cattle and horses have become accustomed to it as a pasture, seeking it out as a good range and well watered. Defines said tract as half a league north and south and one league in the other direction—the form of the tract being triangular.

(Duly signed and authenticated.)

Under date of 27 Jan'y, 1842, the prefect of the 2nd district, Arguello, directs that the second justice of the peace of Los Angeles inquire into the claims of said de la Osa, and report as to whether the land claimed by him belongs to any corporation, community or individual, and whether the claimant has sufficient stock to cover it.

(Duly signed and authenticated.)

Under date of 28 January, 1843, a report is made on the subject by Antonio F. Coronel to the prefect of the second district, to the effect that the petitioner has sufficient stock to cover the land, &c.

(Duly signed and authenticated.)

On the same day a report is made to the same official (the prefect of the second district) by Jose Ma. Villar of San Fernando mission, to the effect that the land claimed is unoccupied save as regards a small tract cultivated by the mission, and that the rest is occasionally occupied only by wandering cattle from time to time.

February 8th, 1843, the prefect reports to the governor
121 that the land claimed by de la Osa is vacant, with the exception of the small tract cultivated by the mission and another small tract cultivated by the Indian Jose Miguel, and recommends that it be granted to him, inasmuch as his stock is already accustomed to it.

(Duly signed and authenticated.)

Whereupon, under date of March 1, 1843, Governor Micheltorena confirms the grant by endorsement on the papers.

(Duly signed and authenticated.)

Grant further confirmed March 23, 1843, by formal proclamation.

March 18, 1846, a report was made by the committee on public lands as to the rights of the Indian, Jose Miguel Triunfo, in and to a portion of this rancho (Providencia), in which report occurs the following language:

"Second. Bearing in mind that the land of which donation is made to Don de la Osa is purely of one league, for black cattle (ganado mayor), and that within the Indian, Jose Miguel, has a part."

(Duly signed and authenticated.)

Twentieth. "Expediente" in the matter of the grant of the San Rafael Rancho to Jose Maria Verdugo.

Under date of October 20, 1784, Jose Maria Verdugo, corporal of the garrison of San Diego, on duty at the mission of San Gabriel, makes petition to the governor to grant him certain lands for the keeping of his "small animals," as well as horned cattle and horses,

said lands being described (in part) as "adjoining the place of taking out water for the use of the pueblo of La Reyna of Los Angeles."

"And considering that there may be no inconvenience whatever, as well as to not injure the town of the Queen of the Angels (Los Angeles) as neither this mission, &c."

(Duly signed and authenticated.)

122 Twenty-first. "Expediente" in the matter of the claim of Dona Maria Ygnacio Verdugo de Feliz to the Los Feliz rancho.

A. D. 1843.

The pertinent part of this expediente is found in the final decree of Manuel Micheltorena, governor, of date 17 March, 1843, in which decree he declares "Dona Maria Ygnacio Verdugo and her son Jose Antonio Feliz, owners of the lands known by the name of Los Feliz, bounded * * * on the south by the river of the pueblo, * * * in extension of one league and a half for black cattle (ganado mayor)."

Attached to this "expediente" is a map (deseno) of the Los Feliz ranch, the southern boundary of which is designated as "Lindero Rio del Pueblo."

The ground of the final decision in favor of Maria Ygnacio Verdugo de Feliz was that this land had been previously granted to her husband, Juan Feliz, and the decree in this case was simply a confirmation of said former grant to Juan Feliz.

Twenty-second. Minutes of the session of the "ayuntemiento" of the pueblo of Los Angeles, held Sept. 6, 1833.

City Archives, vol. II, pages 67–69–72.

At this session Juan Feliz, occupant of the place of San Jose (or the Feliz rancho) presents a complaint that he had been despoiled of a portion of his lands by the alcalde. By common consent the expediente was referred to a committee, to report on the same at the next meeting.

This petition of Jose Maria Verdugo is indorsed as follows by Governor Pedro Fages:

"I concede to the petitioner the permission which he solicits, of keeping horned cattle and horses at the deep ravine, &c., provided that it does not injure said mission nor the inhabitants of the pueblo of the Queen of the Angels (Los Angeles)," &c.

(Duly signed and authenticated.)

In December, 1796, the said Jose Maria Verdugo makes a further petition to the governor regarding the same lands, setting up

123 that he has in "the place of the water-course" 200 head of black cattle (ganado mayor), 200 head of horses, and 150 of sheep, and a small piece of land for the sowing of grain, irrigated by means of a dam.

Recites that, though he considers himself within the boundaries of the town, he does not injure the inhabitants of that place.

(Duly signed and authenticated.)

It appears further from the report of Antonio Grafera to the governor, dated 13 Dec., 1797, that said Verdugo, the petitioner, "has

already accumulated a considerable number of black cattle (ganado mayor), horses and sheep, &c., and has open lands on which he gathers his crops, and his dam of water." And that this land adjoins the town of Los Angeles.

This grant approved by the ayuntamiento of Los Angeles, 18 January, 1823.

Twenty-third. Minutes of the session of the ayuntamiento of the pueblo of Los Angeles, held 21 January, 1836.

There were read four decrees from the governor and general commanding of the Territory:

First. That the pueblo of Los Angeles is made a city, and the capital of the Territory.

City Archives, vol. II, p. 141.

Twenty-fourth. Minutes of the session of the ayuntamiento of the pueblo of Los Angeles, held respectively the 7th, 14th and 28th days of April, 1836.

City Archives, vol. II, pages 181–182–199–202.

At the session of the 7th of April, 1836, the president reported that "the person in charge of the San Fernando mission was making a dam in the river of this city, and that he has been informed by a committee which he sent to examine it, and by some residents, that said "toma" causes much injury to the community dam of this place, and he therefore informs the ayuntamiento, in order
124 that they may determine what is proper." Whereupon an investigating committee was appointed.

At the same session William Wolfskill makes petition "for permission to open a ditch from the river of this city," which was referred to the committee, &c.

At the session of April 14, 1836, the committee appointed to investigate the alleged injury done the city by the dam erected on the ex-mission of San Fernando, reports as follows:

That the dam was erected on "one of the springs of water which form the river of this city;" that said dam does not injure the citizens of this place, inasmuch as said river has sufficient water for the community, and that "the person in charge of the mission has promised that if in any contingency the said dam should cause any injury to the city, he, at his own cost, will be responsible for all the injury, and that if there should be a scarcity of water in the river, he will destroy the dam, and let all the water go."

At the session of 28 April, 1836, the committee to whom was referred the petition of William Wolfskill for permission to open a ditch from the river of this city, below the vineyard of Maximo Olaniz, reported that "there was no inconvenience in granting him said *said* permission," which was approved by the ayuntamiento, with the condition "that the party in interest shall remain subject to whatever the supreme government may dispose in the matter."

The foregoing minutes are duly signed and authenticated.

Twenty-fifth. A resolution passed by the ayuntamiento of the city of Los Angeles, 8th October, 1833, authorizing Jose Antonio Carrillo, the president of said ayuntamiento, to bring proceedings in

the proper courts on behalf of the corporation of the city against rev. minister of the mission of San Fernando, with reference
125 to the rights claimed by said mission in the place called Cahuenga, where the said mission has built buildings and placed cattle, although said lands are recognized as part of the common lands of this pueblo.

(Duly signed and authenticated.)

Twenty-sixth. (Translation.) Their stamps, two reals (25 cents,) authorized provisionally by the maritime custom-house of the port of Monterey, in the department of the Californias for the years A. D. 1840 and 1841.

[SEAL.] XIMENO Z.
ANTONIO MARIA OSIO. [SEAL.]

Ygnacia Palomares, president of the illustrious ayuntamiento of the city of Los Angeles certifies that in conformity with the petition of the Senora Maria Ygnacia Verdugo de Feliz, the illustrious corporation of this city, in session of the 15th day of the current month, resolved, that there be granted to her the use of the water of the river of Our Lady of the Angels to cultivate the land of the pasture ground of the Feliz of place of San Jose.

Los Angeles, February 17, 1841.

YGN. PALOMARES, *Pres't.*
YGO. CORONEL, *Sec'ry.*

Plaintiffs then called BURR BASSELL, as a witness, who, being duly sworn, testified as follows:

Have resided in the city of Los Angeles since the spring of 1884. Am a civil engineer. Have been practicing that profession since 1883. Am familiar with the Los Angeles river and the locality through which it runs. Am familiar with the lands sought to be condemned in this section. Have known it in a general way ever since I have been here, but more in detail within the last six or seven years. Acquired my knowledge largely by actual surveys upon the ground, mainly for the city. Began the first work for the city in the year 1891 or 1892. Worked for the city two years, I
126 think, at that time. Worked on the proposed head works, under Mr. Dockweiler's administration as city engineer. I did most of the actual work of preparing the general scheme for these headworks. Have made numerous surveys in the vicinity of those lands, and made a report upon it once to Pomeroy and Hooker; upon this same property. I have examined this property and the river in this vicinity with a special view to the matters involved in this action. I know approximately how much water is diverted by the City Water Company for supplying the city.

I do not think the amount exceeds ten million gallons a day. That would be between seven and eight hundred miners' inches, running constantly.

Fifty miners' inches is equivalent to one cubic foot per second. I know about how much water the city diverts through its ditch, which is now situated upon this land proposed to be condemned.

It varies considerably from time to time. Five hundred inches more or less. It will run in that vicinity—average that all the time. I don't know how much is diverted by the city at the dam at the Buena Vista Street bridge. I hardly have the data to form an estimate or opinion. I don't know the capacity of the flume this side.

The land sought to be condemned is of greater elevation than the city. It is about one hundred and ninety feet above the plaza in the city in elevation. It is a more favorable location for the concentration and diversion of the waters of the river on a scale such as is proposed to be done here than any point below at a less elevation. I am familiar with all the land that is sought to be condemned. I prepared plans for these headworks myself in the main.

(By the CITY ATTORNEY:)

Q. Upon what basis as to necessity were these headworks prepared and this land recommended, if you know?

127 The defendants objected to the question as irrelevant, immaterial and incompetent. The court overruled the objection and the defendants excepted.

Answer. Well, this particular land was recommended because of its favorable situation in the neck of the valley there, being the key, as it were, to the waters of the Los Angeles river and its underflow, and the size or territory was selected such as to be ample for the present and future needs of the city, based upon investigations of the amount of land required for certain tunnels and galleries and drainage pipes, that estimate based partly on the experience at Crystal Springs, partly on the investigations made upon the ground itself, and largely from the experience gained elsewhere.

(By Mr. CHAPMAN:)

Q. Those plans and specifications which you speak of, the general plans, were committed to writing and drawings, weren't they?

A. There were maps made; yes, sir.

Q. You may state why the main tunnel line is constructed as it is laid down upon the map.

A. Well, it is laid upon the plans as it is, first, to be a main gathering way for laterals that may run into it extending clear across the territory to be condemned and is for the conveyance of the subterranean waters as well as the surface waters. The laterals are to intercept the subterranean flows and conduct them into the main channel line. The particular reasons for the tract sought to be condemned being made of the length and width that it is, in the first place, this tract extends along the visible stream of the Los Angeles river from the hills on the south to the mesa bluff on the north in general, and from the line between the Providencia and Los Feliz ranchos as far west or up the river as we thought necessary and desirable to condemn. The line follows in a general way the mesa bluffs on the two sides. The bluff on the south side

is high precipitous hills, composed of granite and sand-
128 stone formation in some places; but it is quite rough and precipitous. There are one or two mesas at the bluffs, the base of this line of hills, and then the river also impinges very close the base. The soil at the base is disintegrated granite and sand. The bluff is granite and sandstone, impervious to water. Presents a natural barrier to the waters on the south side. That is the case all over the south line of the lands sought to be condemned. The bluff along the north line is an alluvial deposit of disintegrated granite mainly. It is a high mesa sloping down to the bluff, which has been eroded, cut away from time to time, by the flood waters of the river. The object of taking the water from the underflow instead of from the surface flow is, in the first place, the natural filtration of the water is better than the surface water, which is more or less contaminated with decaying organic matters, and also from any foreign pollution that may occur on the surface, such as hog pens, or sewerage from private dwellings, or anything of that kind. One object to be attained by embracing this whole territory in the lands sought to be condemned would be to keep as pure the source of supply as possible, by preventing any contamination at the point where we divert the waters. At the present time a large portion of the land is covered with a dense growth of weeds and tules and decaying organic matter, which ought not to be permitted, and there are hog ranges on and adjacent to this land, which pollute the waters. Stock is allowed to run over the land.

(By the CITY ATTORNEY:)

Q. What would be the result as to the purity of the water, of the city having the rights of way simply where these galleries are and private parties owning and using the land as they see fit, outside these narrow rights of way?

A. Well, there would be some difficulty, possibly, in compelling private parties to refrain from polluting the headworks.

129 The counsel for the defendant objected to the answer as not responsive to the question, and as stating the witness's opinion of the legal difficulties, or difficulties of enforcing legal remedies, and that it was incompetent. The court overruled the objection and the defendants excepted.

(By the CITY ATTORNEY:)

Q. What would be the result of the ordinary uses of the land for farming or stock-raising in and about, adjoining and over these pipes or chambers supposed to be laid, upon the water, if any?

A. Well, it would depend upon what uses those lands were put to.

Q. I said, supposing they were used for ordinary farming purposes and stock-raising, for the keeping of stock incident to ordinary agricultural pursuits.

A. Yes sir, if you would keep hogs it would certainly be detrimental. It is not possible to tell the exact number of filtration galleries necessary for the use of the city at this time, because until

those galleries are actually constructed, it is impossible to tell exactly how much they will yield, and then, too, as the city grows its supply or demand will be greater, and they will need to be extended from time to time to conform to the growth and needs of the city. There is no real distinction between what we call the tunnel and the filtration galleries, excepting that what we designate the main tunnel will be the main artery or conduit to convey the waters through, and what is called the filtration gallery is merely a subterranean tunnel. There are various forms of construction. Generally with an open bottom or open sides, to admit the water freely from the sands and gravel formation, or sometimes they are pipes with open joints, or perforated pipes. Different modes of construction, the object being, however, to collect the waters that are flowing underneath the surface and conduct them in a conduit. They are not in the nature of an artificial filter, but simply a tunnel con-
130 structed so as to allow the waters from the outside to flow in.

The natural filtration of the water is better than the artificial. It would be impossible at this time to exactly locate the number and the points where the filtration galleries will be necessary, because engineers might differ as to which would be the most economical and best place to locate a gallery. On portions of this land sought to be condemned the river does shift its channel from time to time, somewhat, depending on the flood.

Q. Well, now, in case the channel of the river shifts, it would become necessary, would it not, to extend these galleries or perhaps build new galleries?

A. Well, that might be desirable, but still I don't think that a gallery, at least directly under the river at any point, will draw from the river immediately over it much. The idea is to get the waters that are flowing underneath this river, not only its visible channel but the adjacent land which is water-bearing.

These filtration galleries could be constructed in sufficient number and at proper points on this land to drain the surface of the river entirely, I think. It would depend upon the depth at which you placed them and the general character of the gallery itself. Galleries are often supplemented with wells, which are of great assistance in collecting the waters. The borings that we made show that the river has and does change its channel. I think there is only one place where the river may not have flowed within comparatively recent years. There is one higher mesa that I think it has been ages since the river was over that. With that exception I think there is no part of it but what has been overflowed. I think it is liable to overflow any and all of it, except a very small portion. This is near the southeasterly end. near station 22 of the Rancho Los Feliz. The present main supply ditch of the city makes a detour around this high
131 mesa. The main object of taking in that high ground is it is desirable to tunnel through it and it is also water-bearing. That does not present an obstruction to the flow of the waters from the west down to the east. The soil of this high ground is of the same character as the rest, possibly a little coarser, a portion of it,

but it has eroded from the hills to the south. Is disintegrated granite and sand, and the water seeps through it. When you go down through it with a well, the soil is very similar with the balance of the soil. Very much like the soil directly under the river as it runs now. In the main coarse sand gravel and boulders; in certain portions very coarse. Not mixed with loam, excepting on the surface.

I think that upon the actual construction of these headworks it may be necessary or expedient to put filtration galleries at almost any point upon this land. I think an engineer cannot tell how many may or may not be necessary until we get the work actually under way.

(By the CITY ATTORNEY:)

Q. You may state, then, Mr. Bassell, whether or not all the land upon which galleries will not be constructed is necessary to protect the purity of the water to be drained into these galleries.

The defendant- objected to the question upon the ground that it was incompetent, not the subject of expert testimony, and if it were, a hydraulic engineer is the proper expert upon that subject. The court overruled the objection and the defendants excepted.

The witness answered: I think all the land sought to be condemned is necessary in this case.

Cross-examination:

The tract of land is quite irregular in outline, but it is about two miles in length and half a mile in width, at its widest point.
132 The average width would probably be not more than a quarter of a mile.

(By Mr. CHAPMAN:)

Q. Do you know whether or not the city has had prepared any plans for the construction of this so-called headworks, tunnels, filtration galleries, etc.?

A. There were plans begun but never perfected; never completed. No complete plans were submitted to the city authorities, nor adopted by the council.

Q. Well, were there any plans, completed or uncompleted, adopted by the city council.

The counsel for the plaintiff objected as not the best evidence and not proper cross-examination. The court sustained the objection and the defendants excepted.

Q. Do you know anything about what the city does propose to do there?

A. Yes, sir. I found it out by working upon and planning it. Worked on the survey of the land and proposed conduits. I cannot tell from memory the length of this main tunnel that is intended to be. It is given on the map, I think. I have made tests over a large portion of the land sought to be condemned with reference to the water in it. From those tests I ascertained about what was the

percentage of water with reference to the whole mass of the material. I estimated it at thirty per cent.

Q. Now, could you not determine what would be the length of the tunnels and filtration galleries necessary to obtain the amount of water; any given amount that you wanted to supply to the city of Los Angeles?

A. You can approximately and in a general way, but before construction it would be necessary to make certain preliminary tests. It would be wise to do so before, because we do not know exactly what form of galleries to adopt in certain formations, without
133 knowing exactly. The form of the gallery would depend something upon the formation. Different formations will yield different quantities of water. Whether we should construct one sort of gallery or other, does not depend upon the quantity of water we are going to get, but the kind of material in which we are going to get it.

This tract of land is about seven miles from the limits of Los Angeles city. The conduit proposed to be constructed would be one hundred and ninety feet in elevation above the plaza of the city. The surface of the ground would average something over that, probably 200 feet. The 190-foot elevation above the city is estimated at the southeasterly end of the land. The tunnel we propose to construct varies in its depth below the surface of the ground. At the easterly end of the land it would be very near the surface, in fact it would be an open cut for a portion of the way. There is one tract at the easterly end and the southern portion of this land where I think the water has not run for many years. There are a few scattering oak trees on the mesa and the hillsides, quite a good deal of oak timber. The hillsides are near the head of the present main supply ditch that connects on the south side of the river, and on this tract of land sought to be condemned, and a quarter of a mile or more from the Los Feliz line and west, possibly nearly half a mile, I should think. The land where these oak trees are growing is from 30 to 50 feet higher in altitude than the surface of the river. I don't think the Los Angeles river has flowed over the land covered by that oak timber for many years.

Q. Then there are two places where it has not flowed for a long time, are there not?

A. Well, the mesa was made by the washing down of those hills, yes sir.

Q. By the river or by the rains?

A. I can't say. I should think some of the oak trees are 20
134 inches in diameter. The area of the land over which I think the river has not run for a good many years, at a rough estimate, is about 50 acres. I can point out on the plat that accompanies the complaint in this action the mesa to which I referred, when I said that I thought the river had not flowed over it for a good many years; it is the portion on which the acreage is marked "288.42," and the hachur-s representing the hills just immediately south. Those marks along on the south line of the tract represent the hills; these dots. I don't know what the area of the moun-

tains included in the land sought to be condemned, as marked on the map, is. The evidences of loam that I referred to as being immediately upon the surface, varies in depth from nothing to 20 feet. That mesa that I spoke of is largely sand, but you might call it loam, for 15 to 20 feet at certain points. We strike the gravel along the line of this proposed tunnel at a depth of about 18 feet. The filtration of the waters through this sand and gravel and other earthy material tends to make it purer than the surface of the stream. I made no chemical test to discover whether there was any difference between the surface and the underflow or not. The question of whether it was purer or not would depend something upon what it filtered through. I hardly think that at the depth of this tunnel any ordinary use of the surface of the land for agricultural or horticultural purposes would affect the water flowing at a depth of 15 feet below the surface. I think that hogs running upon the land would have a greater tendency to render it impure than almost any other use of it.

Q. Would that depend in any measure upon how the stock was maintained, as to whether they were permitted to roam freely over every part of it, or whether the pigs were penned somewhere about the tunnels?

135 A. Well, I think they should be penned on the land at least having a depth of 20 feet between the surface and the gallery. I think they would have to be confined upon the land to prevent defiling of the water. Penned somewhere else than where the tunnels were.

Q. Do you think that if hogs were penned right immediately in the vicinity of the tunnel, at that depth, that it would have any tendency to render the water impure?

A. I think not.

They would not be likely to remain on the high dry mesa if left to run loose. They generally seek the water. The tunnel is at a depth of more than 15 feet crossing that higher mesa. I can't tell from memory how far beneath the surface it does go according to the plans. All of the city of Los Angeles lying below a four-hundred-foot contour above the level of the sea would be covered by gravity by water taken from this land, according to the proposed plan. There would be quite a large portion of the hilly portion of the city that would not be covered by it—in Elysian park. It would not reach Angeleno heights.

Redirect examination:

I meant by saying that the plans were not completed for this work, the details of the gallery. The general plan for the tunnel and galleries is completed. Supposing the mesa to contain about 26 acres in the hill, I should say that there is about 18 or 20 acres that has not been covered by overflow in a great many years. The other little mesa is not to exceed five acres, I think. That has not been overflowed in comparatively recent years. The other land in the tract sought to be condemned, that has not been overflowed in my opinion, is the hillsides. The elevation for the

purposes of furnishing the city with water from the proposed
136 headworks is about 60 feet higher than the elevation of the present headworks owned by the City Water Company and used to supply the city. There could be considerably more territory in the city furnished with domestic water from this land than is now furnished by gravity.

The rest of the city would have to be furnished with water by pumping from this supply to a surface reservoir at a higher elevation. That is the method used now for furnishing the higher portion. To take the water from the land sought to be condemned would cheapen the cost of pumping, as it would have to be pumped 60 feet less in elevation.

The court then asked the witness the following question:

Q. You testified in cross-examination that about one-third of the substance of the land in this area was water. What did you mean by that statement?

A. I meant that if you were to make a cross-section of the valley at the eastern end there of this land, that being composed of coarse, granitic sand and gravel and boulders, it would be fair to estimate the water as occupying the voids amounting to 30 per cent. of the space. It would vary depending on the size and kind of material from say 20 per cent. to 48 per cent.; I would average it about 30 per cent.

Q. You say that without reference to any currents or flow of the water in the soil?

A. Yes sir. I spoke of it as a general average for the cross-section.

Q. Do you include in that the water that is flowing in the stream above the surface of the ground, or water which is beneath the surface of the land?

A. No, sir; just the water that is beneath the surface.

By Mr. CHAPMAN:

Q. As I understand you, in this water-bearing strata of
137 which you speak, of fine sand, coarse sand and gravel, an average of 30 per cent. of the mass is water?

A. Yes sir; the interstices are about 30 per cent.

By the COURT:

Q. And those are now filled with water?

A. Yes sir.

I have not made any test to determine whether that water is motionless or is flowing in the soil. There are methods of determining. What might be gotten in these tunnels for a given time would depend on the speed with which the water was finding its way through the ground, and that would depend on the kind of material and the inclination, or the grade of the water—the head, as we express it.

When I spoke of the cross-section extending clear across the valley, I used the expression "clear across the valley" as I intended to. I don't mean the San Fernando valley, but the narrow channel at the

eastern end of this tract. The distance that I meant to embrace in that cross-section, in which one-third or thirty per cent. of it would be water, commencing on the hill at the south end of this tract, is something like a half mile at that point. Beginning at the hills that form this impervious wall on the south extending in a northerly direction across the easterly end of this land in suit for a half a mile, more or less; approximately half a mile. The entire country is covered with this same kind of deposit that I speak of in which from 30 to 33 per cent. of it is water; that is, it is filled up with this deposit.

Plaintiffs here offered in evidence a map entitled "Map showing land from proposed headworks, Los Angeles city water supply, location of tunnels, filtration galleries, wells and so forth, Los Angeles county, California, September, 1895; scale 200 feet to an inch," and Mr. Bassell testified that the map was prepared for general use at the trial here. The scale was 200 feet to an
138 inch; that he didn't find any places in Los Angeles river that were as wide as it appears on that map, as it appeared by that scale; that was probably made some time when the waters might have been high and overlapping more of the bottom, which map is here referred to and made a part of the statement (a copy to be inserted when the statement is settled).

Plaintiff next offered in evidence copies of the ordinances, copies of which were filed in evidence. The ordinances were numbers 1436, 1451, 1717 and 2636.

Plaintiff next offered in evidence deed from the Providencia Land, Water and Development Company, a corporation, to C. H. Harrison, dated February 29, 1892, for an apparent consideration of ten dollars, which deed granted to Harrison block 65 and other property in the Rancho Providencia, and the Scott tract, according to the recorded map in Book 43, page 47, Miscellaneous Records.

Plaintiff next introduced in evidence deed from C. H. Harrison to A. E. Pomeroy, dated February 29th, 1892, conveying the same property, when the following colloquy occurred:

The COURT: What is the purpose of these deeds? I don't understand.

Mr. SCOTT, of counsel for the plaintiff: Well, we wanted to show the title of the parties and how it stands with regard to being segregated tracts.

The COURT: What for?

Mr. SCOTT: Well, I say for the purpose of showing that these tracts here constitute parcels of which we seek to condemn part: and that only the remaining portions of these lands here will be considered as damaged; with the same idea that we introduced that map of the Providencia.

The COURT: I thought that was admitted by the pleadings. I didn't know there was any issue on that.

139 Mr. CHAPMAN: No sir, not the purpose that Mr. Scott has in view here in introducing them.

The COURT: You mean to offer it for the purpose of limiting the area of the larger parcel?

Mr. SCOTT: Yes sir.

The COURT: Well go on. I didn't understand you.

The court stated, however, that it seemed to him all that is proper to be introduced when you com- to the jury. It affects the question of damage and nothing else, I believe.

Mr. SCOTT: Well, the court as we understand it, and as we desire to have the issues put before the jury, will itself determine what lands are owned by the parties, and will only submit to them the issue in regard to the damages as to certain parcels; that they won't pass upon any of those questions.

Mr. CHAPMAN: What questions?

Mr. SCOTT: The questions as to what the subdivision is, or what the piece is that we are seeking to condemn, and what is the remaining portion, and what rights the defendants have in the land. That will all be determined by the court, as we understand it. At any rate, these deeds can't do any harm.

Mr. CHAPMAN: We shall differ very widely as to what is before the court before we get through, unless we have some written stipulations as to what is before the court.

Mr. SCOTT: Even if the evidence wouldn't be material, that would be the only reason why it wouldn't be admissible.

The COURT: Well, the idea I had about what I was going to determine in advance concerning the character of the property was that I could only determine those issues tendered by the complaint concerning the character of the property, and that was only in regard to the water right. These other issues, it seems to me,
140 only come up incidentally; that the defendants are entitled not only to the value of the particular property taken, but also the damage which may be caused by the severance of that particular tract from the larger parcel; and that is only in connection with the damages.

Thereupon the deeds which have been offered were withdrawn.

Whereupon Mr. Chapman, of counsel for the defendants, said: Before you withdraw them, let me state this. I understand that they are the owners of the Los Angeles river and the waters flowing underneath its bed; and the questions upon the question of title to the waters flowing underneath the Los Angeles river, and what were our interests in it as owners of these lands, were the matters which so far we have agreed to try before your honor.

Mr. SCOTT: We have withdrawn them.

Mr. CHAPMAN: I know you have. And that is the reason we didn't object, because that was the view we took of it. And your honor will remember you suggested to the counsel to amend the prayer of the complaint for the purpose of condemning the interests of these defendants in the *in the* lands. And suppose now that the chain of title and what these deeds will show will have something to do with determining what is the estate which is conveyed to them by the deed. That is the only way I can see they can be relevant

to any issue before the court. But it struck me one or the other of us will have to put them in.

The COURT: I understand the allegations of the complaint which are admitted in the answer to carry with them at least implication; that, with the exception of the estate in the property which the plaintiff claims, the defendant was the absolute owner in fee-simple of all the balance.

Mr. DUNN, attorney for the plaintiff: They set that up in their answer; their interests.

The COURT: The ownership which the plaintiff alleges in
141 the defendant is an admitted fact in the case. It is qualified only by whatever estate the plaintiff itself may have.

Mr. CHAPMAN: Well, it might be very reasonably a question as to upon whom it would devolve to introduce the deeds. But in view of that amendment to the prayer, and perhaps for other purposes, as we set forth many things affirmatively, the deeds themselves would be an important link in the chain of title; and for the purpose of showing what is vested in these defendants. The prayer as I understand it seeks to condemn whatever estate these defendants have in the land.

The COURT: Of course, if these deeds have any bearing, and possibly they may have a bearing, on the question as to what estate the city claims in the water, what is really the property of the city, why, they might be admitted now.

Mr. CHAPMAN: Yes sir. That is the way it looks to me. In other words, one object we have in view is that it shall be by the parties shown that the question is purely this legal question that has been discussed so many times; that there is nothing in these deeds themselves that limits the rights of these defendants in the lands and the water flowing through them; and if there is any limitation upon their riparian rights, it is one which is imposed by the law, and therefore if there isn't any question before the court except the le*g*al ones——

The COURT: Well, if that is the case, when it comes before the jury there will be no question of fact to be submitted to them.

Mr. CHAPMAN: Not as to the Los Angeles river.

Mr. SCOTT: Shall we put them in? If they object I will not put them in.

The COURT: They are not objecting. I was objecting to save time. I thought if they had to be put in again you might as well save the time. If the only purpose is as stated, I don't sup-
142 pose it will be necessary for any extensive evidence before the jury.

Mr. SCOTT: Of course we offer them, if we put them in, for every legitimate purpose.

Mr. CHAPMAN: I was simply stating the reasons why we didn't object, because we do desire to develop that fact before your honor, so that it will be upon the record, that there is no dispute here about what the deeds themselves will convey, unless there is some legal principle that is ingrafted into them that changes the ordinary rules

of the effect of a conveyance of a tract of land with an unnavigable stream running through it.

The COURT: Your claim is that it covers the entire property and carries the entire estate with all the incidents to it?

Mr. CHAPMAN: Yes sir; that we are riparian owners, just the same as any other person. And to show, if there is any difference, it must arise out of some Mexican law affecting the pueblos and not out of any limitation in the deed, is the only reason why it seems to us the deeds should go in.

Mr. SCOTT: We will withdraw the deed from Harrison to Pomeroy.

BURR BASSELL was recalled and testified as follows:

I think I know the sources of the Los Angeles river. I would say the sources are the waters flowing upon what is known as its watershed and the snows also; and the watershed embraces what is known as the San Fernando valley and the drainage basins of the Little Tejunga and Big Tejunga and Pacoima and all the small streams entering this valley. The area of watershed is about 450 square miles. Map entitled "Map showing drainage area of San Fernando valley;" at the lower right-hand corner the square mark represents Los Angeles city limits.

The red line outlines the watersheds, the portion that is
143 mainly white and has the blue-colored lines running through it is the San Fernando valley or plain. The blue lines and dotted lines represent the water courses and washes. The darker patches around the border adjoining the red lines represent the mountains and hilly portion.

On this map there are two areas that are not included in the watershed, above the lands sought to be condemned. Forty square miles and 33 square miles below the land, the drainage from which does not flow into the Los Angeles River watershed above the lands sought to be condemned. The watershed of the Los Angeles river above the lands sought to be condemned contains about 450 square miles. The elevation of the watershed runs from about 500 feet at the point where this land is, to an elevation of over 6,000 feet at some points. The tendency of the water in the watershed above the land is to seek the lowest level, and this land sought to be condemned is the lowest point of this watershed. At first the flow from the water sheds of the Little and Big Tejunga creeks is in a westerly direction and meeting the plain, valley and the Verdugo hills to the south deflect it to the west, and then meeting the flow from the westerly end of the San Fernando valley it is deflected to the southeast around until it arrives at the land sought to be condemned. The narrowest point in that valley is just below the land sought to be condemned. The length of the land sought to be condemned is approximately two miles, and mainly the confluence of the waters coming from these different sources is embraced in that strip of land.

I have worked on these headworks and upon the land in this vicinity since the winter of 1892–'93. My experiments have consisted mainly in test-well borings on the formation on this land and

above it in the San Fernando valley. I have bored or superintended the boring of 55 wells in that vicinity. There are several cuts in that vicinity made by men which I have examined
144 with a view to determine both the surface and underflow of the Los Angeles river. I think there is an extensive underflow through the San Fernando valley. In my opinion there are points of confluence covering a small or limited area.

Question, by Mr. DUNN, attorney for plaintiff: You may state, in your opinion, just where the largest area or main point of confluence of these underground streams is.

To which question the attorneys for the defendants objected, on the ground that it was assuming facts not proven; that there are any underground streams, and, secondly, upon the ground that the issue as to whether there ar- any percolating waters in this soil, and how much there is of it, is not before the court, and that the evidence is irrelevant and immaterial to any issue to be tried before the court; and, thirdly, that there is no sufficient foundation laid for an opinion upon that subject.

The COURT: I am inclined to think some of those objections are well taken. I don't believe the court is now engaged in an effort to determine how much water there is there that belongs to the river, and how much there is that does not; and that seems to be the object of the testimony. I think the jury has to determine that.

Mr. DUNN: I imagine then, if that is the case, we are in a position to rest.

The COURT: I don't see how I can do any good to determine that there is a certain amount of water flowing there that belongs to the river and a certain amount that does not belong to the river, when the jury has to determine the same thing in its own way from the same evidence.

Mr. DUNN: I think the ideas of the court and the ideas of counsel on both sides are at considerable variance. It makes no special difference to us which way we do this; but we certainly have understood, up to this time, that that was exactly what the
145 court is going to find, precisely. If the court is not going to determine whether the water in this land is a part of the waters of the Los Angeles river, why, of course, we want to know it now, and it will change the line or order of our proof entirely. I think counsel on the other side expected, just as I did, that if this question was to be determin-d at all, they deny the right of the court to determine it at all, but if the question is to be determined at all, it is to be determined by the court.

Mr. CHAPMAN: I don't know why the counsel thinks we have understood it so. I have been trying for the last three or four days to get him aright as to the issues we were to try before the court. I presented our view of it to them, which they haven't agreed to. I asked this morning for them to make a statement of what they proposed to try before the court. They haven't done that yet. And as to the question of percolating waters, or whether there are any at all or not, I told Mr. Scott this morning if that was their view in presenting this case, if they considered that as matter to be taken

away from the jury, that we didn't consent to it; that the whole thing would have to be gone over again. I don't suppose there is any one will deny there is some percolating water there; and the question of the amount it will be necessary for the jury to determine, and all evidence introduced here before the court upon that subject, for any purpose, would have to go before the jury again. In the allegations of the complaint they claim simply the waters of the Los Angeles river and the waters flowing underneath the bed of the stream. I think, too, our objection is well taken, upon the ground the counsel assume what the witness didn't state. He talks about streams of water and the witness says "underflow." I say that the question of the character of the underflow—what it is, whether it runs in defined streams or otherwise, what quantity of water may be flowing in such a defined channel as would alter the rights of
146 the defendants in this action to the land and to the waters, and how much there is of it, are matters, I say again, no matter what we try here before the court, that have to be gone all over again before the jury.

Mr. DUNN, for the plaintiff: We are delighted to hear all of this, your honor, only it is different from what we have heard before, that is all, and it changes the whole line of our proof. We have no objection to it at all.

Mr. SCOTT: I was under the impression that the course of proceeding was for the court to determine exactly——

The COURT: That so many inches belong to the river?

Mr. SCOTT: Yes sir.

The COURT: I have never understood that.

Mr. SCOTT: If it isn't to be done, we will take any course your honor suggests.

The COURT: That would practically be determining the whole controversy. If I should decide that the City of Los Angeles is entitled to the paramount right to the water in this river to the extent of the necessities of the city for the use of its inhabitants and for municipal purposes, that right will vary from time to time as the city grows and as the needs of the city vary, or increase or diminish at different times of the year. The defendants are entitled to all the water the city don't take for that purpose. That is about as far as I could go.

Mr. SCOTT: Sufficient for the irrigation of their lands.

The COURT: I understand that. So far as it is a part of the stream., so far as it is the water percolating in the land, they are the absolute owners of it.

Mr. VARIEL, of counsel for the defendants: That would go as well to the waters flowing in the river.

147 The COURT: That is what I said. so far as it is a part of the stream. That would be a proper statement to make to the jury, but so far as it is not a part of the stream, they can do anything with it they want to. And that is about as near to a definite statement, it seems to me, as I could give the jury after hearing testimony for a week.

Mr. CHAPMAN: The jury never could determine the number of

inches, for the reason your honor stated, that the wants of the city are a variable quantity, and the amount of water in the stream is a variable quantity. At one time there might be a thousand inches the city didn't want, and at another time nothing at all.

The COURT: I would have to state to them the rights of the defendants are subject to those rights of the city, and they would have to arrive at a conclusion from all the evidence what that right was.

Mr. SCOTT: Well, we need a jury, then. We can't go on with the case.

The COURT: I am hearing now, first, the question as to the necessity for the taking of this property; and, next, whether it is so located as to be most compatible with private right and public interest, and so forth; and, thirdly, whether the plaintiff has any interest in the water or not. I think these are the only issues.

Mr. SCOTT: Of course, our title to the water, or the right to use of the water, is shown by certain testimony we have already introduced. If your honor means we shall show whether this is a part of the Los Angeles river, to prove that the right that we have to the Los Angeles river attaches to the water in the land, then, of course, we go on with these experts before your honor. But, if your honor thinks that is a question that should go before the jury——

The COURT: If I once determined that the city is entitled to the paramount interest in the waters of the Los Angeles river, what else can I say?

Mr. CHAPMAN: To the extent of its needs.

148 The COURT: I mean that. What else could I say? I can't determine that the river is so many feet wide, nor that the ground on each side of it is practically and really a part of the river and contains flowing water under its surface which is also a part of the stream. That must be determined by the jury when they come to determine to what the right of the city extends.

Mr. SCOTT: It seems to me that we have proved our title to the river, and the only question is whether this water which is within this land is a part of the river; and, if it is, for the jury to determine to what extent we own these waters; that is as being a part of the stream or being percolating waters. Then that the evidence had better be before them.

The COURT: Of course, the court is not advised as to what evidence you have to offer; whether you have proved, or have any other evidence, or anything about it.

Mr. SCOTT: We are going on to prove the connection between these subterranean waters and the land sought to be condemned and the Los Angeles river, to prove that they were, in fact, a part of the river; in other words, that the river is not composed merely of the surface stream flowing along, but also water subterranean beneath the bed of the river, and in the banks of the river, being connected with the surface stream; and that if you take away any of the water from this subterranean bed or from the banks to a certain distance—it is immaterial whether it is a foot or two hundred feet—that you thereby diminish the water from the river, because

you remove this water which is formed and operated upon a bank or bed for the river.

The COURT: Now, isn't that the very thing the jury will have to determine? Of course if, as I said, it is determined the city has a paramount right to the water of the river, so far as it may
149 need it, the fact it does not use it already would not prevent it or preclude it from asserting and establishing or possessing itself of more of it tomorrow if it happened to need it; and if, at some time it turns out it needs more than the surface water, and has to go underground to take what is a part of the underground waters of the river—not percolating waters, but the underground waters of the river—why, it would have the right to do that some time in the future; and the rights of the defendants then would be subject to this right of the city. And, whatever that right of the defendant, considering all these possibilities, probabilities and uncertainties, would be what the jury would establish. And they would have to do that after hearing all the evidence that you are now proposing to introduce as I understand it.

Mr. SCOTT: Then it would occur to me that we ought to have the jury during the whole progress of the trial here.

The COURT: All the trial on that subject, certainly. Of course, it is not necessary to have the jury here to determine whether this is necessary to be taken for the purpose of establishing headworks, nor whether it is so located as to be most compatible with public good and of the least private injury. Well, you understand what the idea is. And the question whether or not the city has any right to it. Those are the issues I think for the court to determine now without the jury; but when you get past those interests, I think you will have to get the jury.

Plaintiffs then called FRED EATON, who, being duly sworn, testified as follows:

Am forty years old, and have resided in the city forty years. Am a civil engineer and have been practicing that profession for 16 or 18 years. Am familiar with the Los Angeles river, from its source down to the city of Los Angeles. First became acquainted
150 with it from a professional standpoint about 1871 or '72. Was then in the employ of the Los Angeles City Water Company, and remained in their employ eleven or twelve years. My duties frequently took me upon the river. I have been city engineer of this city four years. Am familiar with the plan proposed for the headworks for the city water-works, and with the land in controversy upon which these headworks are proposed to be built. Have been over it quite a number of times. Surveyed over it for the city several years ago. Hunted ducks on it. Have been up there two or three times in this case for the city. Been employed by the city to make these examinations. I suppose that the land averages about 230 feet altitude above Sixth and Main streets in the city of Los Angeles. Some parts are more and some less. There are elevations given here on the map of 490 feet. That is above sea level, and there are lower elevations also. When I first had knowl-

edge of the works of the Los Angeles City Water Company in 1871 the amount of water diverted and used by the people of the city was about 700,000 gallons daily. That is in the neighborhood of 50 or 55 inches under a four-inch pressure. The amount of water now diverted by the city water company for the same purpose is about 10,000,000 gallons a day, or about eight hundred inches under a four-inch pressure. Am familiar with the tunnels and filtration galleries proposed to be constructed upon the land. The intention of these works is to run a main conduit indicated on the map introduced here, what is known as a main tunnel supposed to be a brick conduit, built from the head of the present main supply ditch up the river to the westerly end of the land proposed to be condemned. That main tunnel will have lateral branches running in a southerly and northerly direction across this land sought to be condemned, which are supposed to be open pipes, with open joints to collect the water. These conduits will
151 all be laid below the present surface from three to ten or twelve feet, and are supposed to collect the waters that are passing below the ground in the open formation and draw the waters from the surface. The idea is, to take the water out in this manner, is to get rid of the debris that comes down the river at various times of the year, during the winter season, and prevent the moss that grows in the river from entering the main conduits. To get pure water. It is to strain it—in other words, filter it. I would not say that you could at this time designate exactly the number of filtration galleries or cross-tunnels that may be necessary for the accomplishment of the purpose, because you don't know just how much water you can drain in them. Some will drain more water than others. The shifting in the surface flow of the river will make a change, but the further you get the surface water from one of these subdrains the less of course the drainage will be to that drain.

Question. Isn't it a fact, then, that it might be desirable at any time to construct a new filtration gallery, or to extend those already constructed?

Answer. Yes; it will be necessary to construct new ones as the necessities of the city demand, and also extend those that may be built now.

Q. Now, you may state right there, Mr. Eaton, whether or not, in your opinion, the whole of this land will be necessary for that purpose.

Mr. CHAPMAN: The defendants object to that upon the ground that it is incompetent.

The COURT: I think I will overrule that objection. An engineer can give his opinion as to that subject.

To which ruling the defendants excepted, and the witness answered: Yes sir, all that land will be needed to take in the entire flow of the river at that point. Possibly more.

152 Cross-examination:

The length of the strip is two miles from east to west, and I should say an average of a quarter of a mile wide. The length of this proposed main tunnel is about a mile and a half or more. Extends pretty near the whole length of the land. The city water company have constructed works of a similar nature to those projected, and are now taking from those tunnels or excavations 700 inches. With their underground pipes, and they divert a great deal from the surface in the vicinity of the point that they draw the water from under the ground. They take out about as much from the river as they do through their tunnels; it is not all used by the city. It is used to run water power and whatever they are short on the filtered water they use from this surface water. It is a fact though, that after they use it for power it does return to the zanjas of the city and is used by the city through other ditches. The principal one is the Zanja Madra. The Zanja Madra and another zanja, I think, which used to be 6 E., catches the waste water after they have used it for water power. This zanja 6 E., crosses Macy street at the old Aliso bridge. The city uses, by means of the Zanja Madra, between thirty and thirty-five cubic feet, that is between fifteen and eighteen hundred inches of water at the Buena Street bridge, and about four or five hundred inches below at the covered bridge. Wherever I say inches I mean measured under a four-inch pressure. The five hundred inches is taken out below Macy Street bridge. It is used on some low lands under Boyle Heights and the eastern part of the city. And some of it is taken below the patent boundary of the city, but I cannot, from my present knowledge, say that it goes outside of the charter boundary. It goes off to the Laguna ranch to a portion of that ranch which is within
153 the city limits and a portion outside; I don't know that the water is taken outside of the charter boundary. The charter boundary is about 1,200 feet south of the patent boundary and extends clear across the city, parallel with the southern patent boundary. The northern patent boundary differs from the northern charter boundary. The patent boundary makes a point down at the confluence of the Arroyo Seco and the Los Angeles river. The charter boundary runs right across east and west. There is no difference except that triangle. I am speaking now of what the city was prior to the recent additions to the city by taking in Highland park.

The only difference in the northern boundary between the charter and the patent is the patent boundary coming from the east to the west turns southward and then to the northwestward, making that triangle. The charter boundary ran straight across. There is no difference between the charter boundary on the west and the patent boundary. Besides the Zanja Madra and the city water company works the city diverts about five hundred inches in what is called the main supply ditch, carrying it through the canal and reservoir ditch and the east side ditch. It varies from five hundred inches to seven hundred inches, I should judge, throughout the year.

Q. Can you tell about how much altogether now, and not counting twice the water that is used by the city water company for power, and then back into the city's own ditches, about what is the total quantity now used inside the city limits?

A. I don't know what it is inside. There may be some of this water that is used outside. I remember when there was water used outside of the city from these ditches, but I don't know anything about it now.

154 By the COURT: Can you give the total amount diverted for use without reference to where it is used?

A. Yes sir. It is, I should say, about 75 cubic feet per second, about 3,750 inches all together; and in that computation I am not counting twice the amount of water that the city water company takes for power purposes, and when used flows into the city ditches. That is about the total diversion. That is about the average; it will vary from that from year to year. That is all used for irrigation, except what the water company diverts for domestic purposes and for flushing sewers, including the outfall sewer to the sea. The water diverted by the city water company and supplied to the city is also used for sprinkling streets, extinguishing fires and all sorts of municipal uses, besides the domestic needs of the city.

The population of the city of Los Angeles was agreed to be seventy-five thousand.

The valley at this place where the tract of land lies sought to be condemned, is a part of the San Fernando valley, and is in the Providencia rancho, in part, and the San Rafael, and also in another called the Cahuenga. It lies in three different grants.

The valley where this land lies is about two and one-half or three miles in width in the shortest distance across the valley. I am estimating from the base of one hill to the base of the other. This land sought to be condemned is about a quarter of a mile wide at the place that I am speaking of as being about three miles across the valley. The elevation of the land sought to be condemned on its eastern extremity is 454 feet above sea level, and that is about 200 feet above Sixth and Main streets. That estimate is about the surface of the river. On the western side the surface of the water is about 500 feet above the sea level. Have been employed upon this work by the city two months. Had nothing to do with projecting the plans in the first

155 place. Was city engineer about four years; served in 1889 and '90, and before that. The capacity of the outfall sewer from Los Angeles to the sea is in the neighborhood of 30 cubic feet a second, or 1,500 inches.

Redirect:

The city makes a large use of the water for parks. That water comes from the main supply ditch; is not taken through the city water company's ditch. Taken by the city direct from the river and on the land in controversy here. The first park laid off in the city was Sixth Street park, now called Central park. That was there in 1886. We built a pipe down from the Toberman reservoir, which

is supplied from the woolen mills ditch, which is a branch of the main supply ditch. The next park is East Los Angeles, which is supplied from the east side branch of the main supply ditch. The next park is the Westlake park, supplied from the woolen mill ditch. These have been all made since 1886. The city is the owner of another park on Boyle Heights, the Hollenbeck park, supplied from the east side ditch. There is also a large park known as Elysian park, but there is no water taken from the river by the city for that. I think that water is taken from the city water company. That park is about 500 acres, and is practically unimproved, but is being gradually improved. The land sought to be condemned is, in my opinion, the best point to make the diversion, because you can get the greatest supply of water there by gravity supply at the greatest elevation.

Recross:

The main supply ditch is taken out on this tract of land sought to be condemned, and when it comes down some distance it is divided into two. One goes off and supplies the east side reservoir, and the other the woolen mill. The elevation of Elys-
156 ian park is about seven or eight hundred feet at its highest point. I don't believe any of it could be covered by gravity from this tract of land. No part of it is covered by gravity under the present system. The water that is used there is pumped from the station of the Los Angeles City Water Company.

In answer to questions by the court, the witness said he had examined the plans proposed by the city upon which these water works are based, and he didn't think that there were other plans which the city might use for the same purpose, from an engineering standpoint, equally as good. I think this is the most practical thing for them to do. There are other ways. With the system they have now from that point they could obtain three times the supply they now have, but it has not sufficient elevation. They could not obtain it either, without increasing their pipes and conduits. They would have to run three or four times as much as they have now and increase their drainage area also. There is visible on this land about thirty-million gallons a day. That is equivalent to twenty-five hundred inches. I said thirty millions; it is a little over that—32 or 33 millions on the land in controversy.

It was here stipulated that the boundaries of the city had recently been extended on the north, so as to take in the Highland Park country, and that an election had been called to extend the boundaries on the south; and FRED EATON was recalled on behalf of the plaintiff, and testified as follows:

Am acquainted with the territory south and west of this city, known as Vernon and University, Pico Heights and Harper tract. This is the territory which the election was called to annex to the city of Los Angeles. Witness continuing, said: I have made an estimate of the population in the said districts, and would say there were

about nine or ten thousand people out there. I have made an
157 estimate of the average increase in the consumption of water for domestic purposes and the purposes for which the city water company supplies water in the city of Los Angeles since 1884. I have made this estimate from the increase of the business of the water company. That increase has averaged up to this time about eight hundred thousand gallons a year for the twelve years, or rather about eleven years. The increase would be eighty-eight hundred thousand gallons for the eleven years, which would be about six hundred and fifty inches measured under a four-inch pressure, or an increase of between fifty and sixty inches a year. I should say about sixty. The increase for the last year or two in consumption of water in the city has been fully a million gallons a year, or about seventy-five inches.

Cross-examination:

In my estimate for domestic uses I have included the purposes for which the city water company is supplying water. They supplied water for household purposes, some flushing tanks, partially for flushing the sewers, but they do not furnish all the water that is used for flushing the sewers. Th-y also furnish water for sprinkling streets and extinguishing fires, and all the municipal uses that they supply—that is, all municipal uses outside of the parks. The only park they supply is the Plaza, and I suppose Prospect park. They furnish water also for sprinkling lawns. They have been furnishing water to the Harper tract, outside of the city, but have ceased to furnish it recently. The Agricultural park is outside of the city limits, except the northeast corner, and it is all outside the patent limits. The greatest increase in the population and building of houses for residences is in the southwestern portion of the city.

158 Mr. Scott here stated that the counsel for the plaintiff had concluded it would be best to defer all testimony with regard to the amount of water and the sources from which it came, and the question with reference to whether or not the subterranean waters are part of the Los Angeles river, until they got before the jury; that it is impossible to distinguish and separate the different points, and although it might be proper for them on the question of the necessity, to show that the city owned the waters underneath the lands which they proposed to take, and for that reason essential to acquire the land in order to get its own waters, yet that the things are so interwoven that it would be better to leave it until they get to the jury; and in order to avoid duplicating the testimony, they would keep their expert testimony until the jury was empanelled. That they considered they had made out a *prima facie* case in regard to the necessity, without regard to the question of whether the city owned the percolating waters, if there were any, or not, but that they proposed, on the empanelment of the jury, to follow this up with the testimony that the city is entitled to subterranean waters, as part of the Los Angeles river.

Mr. Dunn here stated that it would be understood that the ordi-

nances that had been offered should be considered as in, subject to any objections that might be made, the objections to be settled at the time they were made.

Mr. CHAPMAN: As I understand it, the ordinances are in anyway, so far as the proof has gone. If you fail to prove your publication you fail to connect, that is all.

Mr. DUNN: Yes; we will make our proof if we don't stipulate it.

Mr. VARIEL: Do I understand that you mean by what you have just said that you don't mean to put in your plans and specifications at all now?

159 Mr. SCOTT: On the contrary, I understand they are now in.

The COURT: They have been introduced.

Mr. DUNN: Yes, sir. The city clerk had a transcript partially made for me of everything connected with it yesterday, and I gave him certain lists I was in a hurry for. I told him some of it could be furnished later.

The COURT: Well, it is all introduced in evidence. There is no use to introduce it again.

Mr. CHAPMAN: It is very difficult for us to proceed on these questions of necessity without having those plans before us to examine the witnesses upon.

Mr. SCOTT: You don't propose to go into your own case now before we finish ours before the jury, do you?

Mr. CHAPMAN: No. While we don't want it understood that we assent to all that Mr. Scott has said, of course we understand that some of the evidence that will be taken before the court will be equally applicable to some of the questions before the jury, and *vice versa*.

The COURT: Do you wish to introduce any further testimony on the issues that the court is to decide?

Mr. CHAPMAN: As I understand it, they say they do.

Mr. DUNN: No sir.

Mr. SCOTT: No, that was the only qualification that we put there, that when we examined our experts that we would go into the question of the subterranean waters.

Mr. DUNN: In short, questions that might be so closely interwoven that they could not be settled without introducing them in two sets and examining them completely the court would consider at the time the same witnesses were examined before the jury.

160 The COURT: I don't see that the question of the subterranean waters is essential to the determination of the question of the greatest public benefit and the least private injury.

Mr. DUNN: We will rest this portion of our case your honor.

Mr. CHAPMAN: You don't want to introduce our patents, then?

Mr. DUNN: You will do it anyway, won't you?

Mr. CHAPMAN: Yes sir.

Mr. SCOTT: And you will let us introduce the expediente of the Providencia and Los Feliz?

Mr. CHAPMAN: I think you have got most of that in in your Baldwin suit, anyway.

Here the map upon which the witnesses have been examined was

introduced in evidence by the plaintiff, and marked Plaintiff's Exhibit A–1. The map is here referred to and made a part of this bill.

Mr. DUNN: The map shows the proper boundaries of the lands and the pipe lines, as there laid down, and the general design for the scheme of the headworks.

Mr. VARIEL: It is very incorrect in two particulars, as to the width of the river and the swamp land.

The COURT: That map was made at a time when the water was higher than it is now. All those things have been stated here, and they will be taken into consideration.

The plaintiff having here closed its case upon the questions to be determined by the court, the defendant then introduced in evidence the patent from the United States of America to Julio Berdugo and Catalina Berdugo, of that certain tract of land or rancho known by the name of San Rafael, of which said patent, excepting therefrom the field-notes of the survey and general description, is as follows, to wit:

161 The United States of America to all to whom these presents shall come, Greeting:

Whereas, it appears from a duly authenticated transcript filed in the General Land Office of the United States, that pursuant to the provisions of the act of Congress approved the third day of March, anno Domini, one thousand eight hundred and fifty-one, entitled "An act to ascertain and settle the private land claims in the State of California" Julio Berdugo and Catalina Berdugo, as claimants, filed their petition on the twenty-first day of October, anno Domini, one thousand eight hundred and fifty-two, with the commissioners to ascertain and settle the private land claims in the State of California, sitting as a board in the city of Los Angeles, in which petition they claimed the confirmation of their title to the tract of land known by the name of San Rafael, situated in the then county of Los Angeles, and State aforesaid, said claim being founded on two Spanish grants to Jose Maria Berdugo, the first on the twentieth day of October, anno Domini, one thousand seven hundred and eighty-four, by Governor Pedro Fajes, and the other on the twelfth day of January, one thousand seven hundred and ninety-eight, by Governor Borica;

And whereas, the board of land commissioners aforesaid, on the eleventh day of September, anno Domini, one thousand eight hundred and fifty-five, in the cause entitled "Julio Berdugo & *al.*, *vs.* The United States," rendered its decree as follows, to wit:

"In this case on hearing the proofs and allegations it is adjudged by the commission that the claim of the said petitioners is valid, and it is therefore decreed that the same be confirmed."

The land of which confirmation is made is situated in Los Angeles county, and is the same conceded to Don Jose Maria
162 Berdugo, formerly known by the name of Zanga, and now called San Rafael, and located about a league and a half

from the mission of San Gabriel, the same being bounded and described as follows, to wit:

Commencing at the source of the Arroyo Hondo, which arroyo crosses the old road running from the mission of San Gabriel to Monterey, at the distance of about one and a half leagues from said mission, said boundary line running from the source of said arroyo down said stream to its mouth at the river of the pueblo of Los Angeles; thence up the river last mentioned to the place where said river issues from the sierra at the mountain called Cahuenga; thence in a northerly direction from said mountain at the point last mentioned to the Serrito Colorado, and from thence to the place of beginning.

And thereafter the Attorney General of the United States having given notice that appeal would not be prosecuted in the above-entitled cause and a stipulation to that effect having been entered into, the United States district court for the southern — of California "ordered that the appeal now pending in this court, in this case, be and hereby is dismissed, and that the claimants have leave to proceed under said decision of said commission, as under final decree," whereby the proceedings of court upon title became final.

And whereas, under the thirteenth section of said act of third, anno Domini, one thousand eight hundred and fifty-one, and the supplemental legislation, and in accordance with the proceedings had pursuant to said act, and supplemental legislation, there has been deposited in the General Land Office of the United States, a return with the descriptive notes, certificate of advertisement, and plat of survey of the said claim, confirmed as aforesaid, authenticated by the signature of the United States surveyor general for the State of California, which descriptive notes, certificate of
163 advertisement and plat of survey are in the words and figures as follows, to wit:

SURVEYOR GENERAL'S OFFICE,
SAN FRANCISCO, CAL., *4th February*, 1871.

Under and by virtue of the provisions of the 13th section of the act of Congress of the third of March, 1851, entitled "An act to ascertain and settle the private land claims in the State of California," and of the 12th section of the act of Congress, approved on the 31st of August, 1852, entitled "An act making appropriations for civil and diplomatic expenses of the Government, for the year ending the 30th of June, 1853, and for other purposes."

And whereas, the United States district court for the southern district of California, rendered a decision whereby it recognized and confirmed the title and claim of Julio Berdugo *et al.*, to the tract of land designated as "San Rafael," in Los Angeles county by dismissing the appeal from the confirmatory decision of the board of land commissioners, and allowing claimants to proceed under said decisions as final, as appears from the certified copy of the final decree of the said district court, a copy of which is hereto annexed; the said tract of land was surveyed in conformity to the grant thereof and the said decision.

And I hereby certify that the accompanying map is a true and accurate plat of the said tract of land as appears by the field-notes of the survey thereof, made by G. Howard Thompson, deputy surveyor, under the direction of this office, which having been examined and approved, remain of record therein. The boundaries of said grant according to said field-notes are described as follows:

(Here follows description, same as shown on the several maps of both plaintiff and defendants, filed in this cause, and includes the easterly portion of the lands in suit.)

164 In witness whereof, I have hereunto signed my name officially and caused my seal of office to be affixed at the city of San Francisco, this third day of February, A. D., eighteen hundred and seventy-one.

SHERMAN DAY,

[L. S.] *U. S. Surveyor General for California.*

U. S. SURVEYOR'S OFFICE,
SAN FRANCISCO, *4th February*, 1871.

I hereby certify that by virtue of the provisions of the act of Congress approved 1st July, 1864, entitled "An act to expedite the settlement of title to lands in the State of California," notice of the plat and survey having been made of the Rancho San Rafael, in Los Angeles county, finally confirmed to Julio Berdugo *et al.*, surveyed by G. Howard Thompson, United States deputy surveyor, in November and December, 1869, has been advertised in accordance therewith, in two newspapers, to wit: The Los Angeles Republican, published in the county of Los Angeles, State of California, being near to where said land is located, the first publication being on the 16th day of June, 1870, and the last on the 7th day of July, 1870; also in the Alta California, a newspaper published in the city and county of San Francisco, State aforesaid, the first publication being on the 11th day of June, 1870, and the last on the 2nd day of July, 1870, and that the plat of said survey was retained in this office subject to inspection during all of ninety days and until the expiration thereof from the date of the first publication.

In testimony whereof, I have hereunto signed my name officially and caused my seal of office to be affixed in the city of San Francisco, this 4th day of February, 1871.

SHERMAN DAY,

[L. S.] *U. S. Surveyor General for California.*

165 (Here follows plat, same as maps filed by parties in the case.)

Now know ye, that the United States of America, in consideration of the premises and pursuant to the provisions of the act of Congress aforesaid, of third March, anno Domini, one thousand eight hundred and fifty-one, and legislation supplemental thereto, have given and granted and by these presents do give and grant unto the said Julio Berdugo and Catalina Berdugo, their heirs and assigns, the tract of land embraced and described in the foregoing survey, but with the stipulation that in virtue of the fifteenth sec-

tion of said act, neither the confirmation of this said claim nor its patent shall affect the interests of third persons.

To have and to hold the said tract with the appurtenances unto the said Julio Berdugo and Catalina Berdugo, their heirs and assigns forever, with the stipulation aforesaid.

In testimony whereof, I, Chester A. Arthur, President of the United States, have caused these letters to be made patent and the seal of the General Land Office to be hereunto affixed.

Given under my hand at the city of Washington, this 28th day of January, in the year of our Lord, one thousand eight hundred and eighty-two, and of the Independence of the United States the one hundredth and sixth.

By the President:

CHESTER A. ARTHUR,
[L. S.] By WILLIAM H. CROOK, *Secretary.*
S. W. CLARK,
*Recorder of the General Land Office.*

Recorded vol. XI, pages 548 to 569 inclusive.

166 A full, true and correct copy of the original recorded at request of E. T. Wright, March 31, A. D., 1883, at 45 min. past 10 a. m.

CHARLES E. MILES,
*County Recorder.*

(Book 3, page 207 *et seq.*, of Patents.)

The said patent embraces within its limits a portion of the Pomeroy and Hooker tract, as shown upon the map, and through the said portion of the said San Rafael rancho belonging to the said defendants, Pomeroy and Hooker, the Los Angeles river flows in its natural course.

The defendants then introduced in evidence a patent from the United States of America to David W. Alexander and Francis Mellus and Augustin Olivera of that certain tract of land known as Cahunega, of which said patent, omitting the field-notes of the survey, the following is a copy:

The United States of America to all to whom these presents shall come, Greeting:

Whereas, it appears from a duly authenticated transcript filed in the General Land Office of the United States that pursuant to the provisions of the act of Congress approved the third day of March, one thousand eight hundred and fifty-one, entitled, "An act to ascertain and settle the private land claims in the State of California," David W. Alexander and Francis Mellus, in company, and Augustin Olvera, as claimants, filed their petition on the 8th day of November, 1852, with the commissioners to ascertain and settle the private land claims in the State of California, sitting as a board in the city of Los Angeles, in which petition they claimed the confirmation of their title to a part of the tract of land containing one-fourth of a league, a little more or less, known by the name of

"Cahuenga," situate in the county of Los Angeles, and State
167 aforesaid, said claim being founded on a Mexican grant to the Indian Jose Miguel Triumfo, made on the 5th day of May, 1843, by Manuel Micheltorena, then governor of the department of both Californias.

And, whereas, the board of land commissioners aforesaid on the 15th day of November, 1853, rendered a decree of confirmation in favor of David W. Alexander, Francis Mellus and Augustin Olvera for the undivided three-fourths of the tract of land described in their petition and known by the name of "Cahunega" in the following shares and proportions to wit: "Alexander & Mellus one equal undivided half thereof," and Augustin Olvera one equal undivided fo-rth of said tract, which decree or decision having been taken by appeal to the district court of the United States for the southern district of California, the said district court, at its December term, 1856, in the cause entitled "D. W. Alexander *et al.*, appellees, *ads.* The United States, appellants," rendered its decision as follows to wit:

"It is ordered, adjudged and decreed that the decision of said board of commissioners be and the same hereby is affirmed in part. And it is further decreed that the claim of the appellees is good and valid, and the same is hereby confirmed to them as follows: The land of which confirmation is made is the land called Cahuenga, in the county of Los Angeles, bounded as follows: Commencing at the willow or old fence mentioned in the grant and in the judicial possession as the initial point thereof, thence northerly, following the first line of the judicial possession and extending the same as far as the edge of the Encenal or oak grove; thence westerly in a line parallel with the further line of the judicial possession twelve hundred and fifty (1,250) varas; thence southerly and parallel with
168 the first line to a point where this line would intersect the fourth or closing line of the judicial possession; thence following said fourth line to point of beginning."

And the Attorney General of the United States having given notice that appeal in this case would not be prosecuted to the Supreme Court of the United States, the aforesaid district court on the 4th day of June, 1857, "ordered that the order of this court heretofore made on the 24th day of February, A. D. 1857, granting an appeal to the Supreme Court from the decree of confirmation of this court in this case filed on the 13th day of December, A. D. 1856, be and hereby is vacated and that the claimants have leave to proceed under the said decree as under a final decree whereby the proceedings of court upon title become final."

And, whereas, under the 13th section of said act of 3d March, 1851, and the supplemental legislation and in accordance with the proceedings had pursuant to said act and supplemental legislation there has been deposited in the General Land Office a return with a certificate and plat of the survey of the said claim confirmed as aforesaid, authenticated by the signature of the United States surveyor general of the State of California, which certificate and plat are in the words and figures as follows to wit:

U. S. SURVEYOR GENERAL'S OFFICE,
SAN FRANCISCO, CAL.

Under and by virtue of the provisions of the 13th section of the act of Congress of the third of March, 1851, entitled, "An act to ascertain and settle the private land claims in the State of California," and of the 12th section of the act of Congress approved on the 31st of August, 1852, entitled, "An act making appropriations for the civil and diplomatic expenses of the Government for the year ending the 30th of June, 1853, and for other purposes," and whereas the U. S. district court for the southern district of California, rendered a decision whereby it recognized and confirmed the
169 title and claim of Alexander and Mellus to the tract of land designated as Cahuenga, and the appeal to the Supreme Court of the United States having been dismissed as appears from the certified copy of the final decree of the said district court, a copy of which is hereto annexed. The said tract of land was surveyed in conformity to the grant thereof, and the said decision, and I hereby certify that the accompanying map is a true and accurate plat of the said tract of land as appears by the field-notes of the survey thereof, made by George H. Thompson, deputy surveyor under the directions of this office, which, having been examined and approved remain of record therein.

The said tract is bounded and described as follows:

(Here follows the description of premises conveyed, being 388.34 acres and designated on the plat of the public survey as lot No. 41, in township one (1) north, range fourteen (14) west, S. B. M., and including a portion of the premises sought to be condemned.)

In witness whereof I have hereunto signed my name officially and caused my seal of office to be affixed at San Francisco, this twenty-second day of *of* December, A. D. 1871.

J. R. HARDENBERGH,
[L. S.] *U. S. Surveyor General for California.*

(Here follows the plat describing the premises granted.)

Now know ye, that the United States of America, in consideration of the premises and pursuant to the provisions of act of Congress aforesaid of 3d March, 1851, and the legislation supplemental thereto, have given and granted and by these presents do give and grant unto the said David W. Alexander *et al.*, and to their heirs the tract of land embraced and described in the foregoing survey, but with the stipulation that in virtue of the 15th sec-
170 tion of the said act, neither the confirmation of this said claim nor this patent shall affect the interests of third persons.

To have and to hold the said tract with the appurtenances unto the said David W. Alexander *et al.*, and to their heirs and assigns forever, with the stipulation aforesaid.

In testimony whereof, I, Ulysses S. Grant, President of the United States, have caused these letters to be made patent, and the seal of the General Land Office to be hereunto affixed.

Given under my hand, at the city of Washington, the second day

of August in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States the ninety-seventh.

By the President:

U. S. GRANT,

[L. S.] By Z. B. STURGUS,
*Ass't Secretary.*

E. A. FISKE,
*Acting Recorder of the General Land Office.*

Recorded vol. 9, pp. 24 to 29 inclusive.

(Indorsed:) Recorded at request of J. A. Graves Dec. 16, 1886, at 16 minutes past 9 a. m. in Book 4, page 16 of patents, Los Angeles county records. Frank A. Gibson, county recorder; by Arthur Bray, deputy.

The said Cahuenga grant or patent also embraces a part of the land belonging to Pomeroy and Hooker, and sought to be condemned in this action, through which said portion of the Cahuenga tract the said Los Angeles river flows in its natural course.

The defendants then introduced in evidence a patent from the United States of America to David W. Alexander and Francis Mellus of that certain tract of land or rancho known as the La Providencia, of which said patent the following (omitting the field-
171 notes of the survey and description in detail) is a copy, and which said rancho embraced a portion of the lands belonging to Pomeroy and Hooker, and sought to be condemned in this action, and through the said portion the said Los Angeles river flows in its natural course, to wit:

The United States of America to all to whom these presents shall come, Greeting:

Whereas, it appears from a duly authenticated transcript filed in the General Land Office of the United States, that pursuant to the provisions of the act of Congress approved the third day of March, one thousand eight hundred and fifty-one, entitled, "An act to ascertain and settle the private land claims in the State of California, David W. Alexander and Francis Mellus, as claimants, filed their petition on the 11th day of September, 1852, with the commissioners to ascertain and settle the private land claims in the State of California, sitting as a board in the city of Los Angeles, in which petition they claimed the confirmation of their title to a tract of land containing one league, more or less, situated between the rancho formerly known as the ranch of Mess Berdugo on the south by the hills that lie on this side, at the north by the mountains and at the west by the Cahuenga, said claim being founded on a Mexican grant to Vicente de la Osa, made on the 23d day of March, 1843, by Manuel Micheltorena, then governor of both Californias.

And, whereas, the board of land commissioners aforesaid on the 18th day of October, 1853, rendered a decree of confirmation in favor of "David W. Alexander and Francis Miller" (Mellus,) which

decree or decision having been taken by appeal to the district court of the United States for the southern district of California, the said district court in the cause entitled "Alexander and Mellus, appellees *vs.* The United States, appellants," rendered its decision as follows, to wit:

172 "It is ordered, adjudged and decreed that the decision of the said commissioners be and is hereby affirmed and that the claim of the said David W. Alexander and Francis Mellus, appellees to the lands as hereinafter described, is valid. The lands of which confirmation is hereby made are known by the name of Providence, and are bounded and described as follows, to wit: Commencing at the southeast corner of said premises at the hill where the river of the pueblo heads, running thence northerly to an oak tree which is marked for a corner five thousand varas; thence running west five thousand varas to another oak tree which is also marked for a corner; thence running south five thousand varas to a high hill; thence running east five thousand varas to the place of beginning, containing in all one square league reference for further description being had to a map which is made a part of the document marked Exhibit A and filed in this case. It is being understood that this decree shall in no way prejudice the rights of the Indian Jose Miguel, nor his heirs named in the grant as being in the possession of part of the land described in this decree."

And thereafter the Attorney General of the United States having given notice that appeal in this case would not be prosecuted to the Supreme Court of the United States, the aforesaid district court at its December term, 1856, "ordered and decreed that the order of appeal heretofore granted in this cause be, and the same is, hereby vacated, and the appellees have leave to proceed under the decree of this court heretofore rendered in their favor as a final decree whereby the proceedings of court upon title become final."

And, whereas, under the 13th section of said act of 3d March, 1851, and the supplemental legislation and in accordance with the proceedings had pursuant to said act and supplemental legisla-

173 tion there has been deposited in the General Land Office a certificate and plat of the survey of the said claim confirmed as aforesaid, authenticated by the signature of the United States surveyor general of the State of California, which certificate and plat are in the words and figures as follows, to wit:

U. S. Surveyor General's Office,
San Francisco, Cal.

Under and by virtue of the provisions of the 13th section of the act of Congress of the third of March, 1851, entitled "An act to ascertain and settle the private land claims in the State of California and the 12th section of the act of Congress approved on the 31st of August, 1852, entitled 'An act making appropriations for the civil and diplomatic expenses of the Government for the year ending the 30th of June, 1853, and for other purposes,'" and whereas the U. S. district court for the southern district of California rendered a decision whereby it recognized and confirmed the title and claim of

Alexander and Mellus to the tract of land designated as Providencia, and the appeal to the Supreme Court of the United States having been dismissed as appears from the certified copy of the final decree of the said district court, a copy of which is hereto annexed. The said tract of land was surveyed in conformity to the grant thereof, and the said decision, and I hereby certify that the accompanying map is a true and accurate plat of the said tract of land, as appears by the field-notes of the survey thereof, made by George H. Thompson, deputy surveyor, under the directions of this office, which, having been examined and approved, remain of record therein.

The said tract is bounded and described as follows:

(Here follows the description of premises conveyed, being 4,064.33 acres of land, designated on the plats of the public surveys
174 as lot number thirty-nine (39), in township one (1) north, range fourteen (14) west, S. B. M.)

In witness whereof, I have hereunto signed my name officially and caused my seal of office to be affixed at San Francisco, this twenty-second day of December, 1871.

[L. S.] J. R. HARDENBERGH,
*U. S. Surveyor General for California.*

(Here follows the plat describing the premises granted.)

Now know ye, that the United States of America in consideration of the premises and pursuant to the provisions of the act of Congress aforesaid, of 3rd March, 1851, and the legislation supplemental thereto. Have given and granted, and by these presents do give and grant unto the said Alexander and Mellus, and to their heirs the tract of land embraced and described in the foregoing survey; but with the stipulation that in virtue of the 15th section of the said act neither the confirmation of this said claim nor this patent shall effect the interest of third persons and also expressly excepting and reserving from the tract of land described and embraced in the foregoing survey, the tract called "Cahuenga" containing three hundred and eighty-eight acres and thirty-four-hundredths of an acre, designated upon the plats of the public surveys as lot numbered forty-one in township one north of range fourteen west of the San Bernardino base and meridian, and finally confirmed to D. W. Alexander, *et al.*

To have and to hold the said tract with the appurtenances unto the said Alexander and Mellus and to their heirs and assigns forever, with the stipulation and reservation aforesaid.

In testimony whereof, I, Ulysses S. Grant, President of the United States have caused these letters to be made patent and the
175 seal of the General Land Office to be hereunto affixed.

Given under my hand at the city of Washington this sixth day of August in the year of our Lord one thousand eight hundred and seventy-two and the Independence of the United States the ninety-seventh.

By the President: U. S. GRANT,
[L. S.] By Z. B. STURGIS, *Ass't Secretary.*

E. A. FISKE,
*Acting Recorder of the General Land Office.*

Recorded vol. 9, pp. 30 to 39 inclusive.

Recorded at request of David Burbank, April 4th, 1873, at 20 min. past 3 p. m. in Book No. 1 of Patents page 238 records of Los Angeles county.

A. W. POTTS, *Recorder.*

The defendants also introduced in evidence the will of Jose Maria Berdugo, of date August 13th, 1828, devising the property known as the Rancho San Rafael to his children, Julio and Catalina Berdugo; the proceedings on the contest of the will by Maria Ignacio Berdugo, the wife of the said Jose Maria Berdugo, and the decision sustaining the will; an exchange by Francisco Lopez and Pedro Lopez to and with Miguel Triunfo, of date March 13, 1845, in which Triunfo exchanged his interest in the rancho known as Cahuenga with Lopez for the rancho known as Tejunga; and a deed from Pedro Lopez to Francisco Lopez of part of Cahuenga; a deed dated October 30, 1849, from Vicente de la Osa, who was the Mexican grantee of the Rancho La Providencia, to Alexander, Mellus and Company, transferring the said rancho, or the interest of de la Osa therein, to Alexander and Mellus; a deed of Francisco Lopez dated October 7th, 1851, to Augustin Olivera of the Rancho Cahuenga; a sheriff's deed of the interest of Pedro Lopez in the Rancho Cahuenga to
176 Alexander and Mellus of date November 5th, 1852; deed of date October 6th, 1853 from D. W. Alexander to Francis Mellus of the Rancho La Providencia; a deed of date October 6th, 1853, by D. W. Alexander to Francis Mellus of the Rancho Cahuenga, and various deeds and proceedings vesting the title to the tract of land in controversy and other lands adjoining the same in the said ranchos, to the defendants in this action. The deeds above mentioned were all in the usual form, making no exceptions or reservations of waters or water rights of any kind. The title to the Providencia rancho was at one time conveyed to David Burbank by deed of date of March 20th, 1867, executed by Alexander Bell, the then owner of said rancho and David Burbank had become the owner of the said tracts of the said La Providencia rancho and parts of the San Rafael and Cahuenga, which included the whole of the Pomeroy and Hooker tract, and including the lands sought to be condemned here, and said David Burbank conveyed the same to W. H. Goucher by deed of date December 27th, 1886, and from Goucher to the Providencia Land, Water and Development Company by deed of date December 28th, 1886. The Providencia Land, Water and Development Company conveyed part of the tract in controversy to C. G. Harrison on the 29th day of February, 1892, and on February 29th, 1892, C. G. Harrison conveyed to A. E. Pomeroy; the part so conveyed was block 65 of the Scott tract as shown on the map hereinafter referred to. The Providencia Land, Water and Development Company conveyed to J. D. Hooker a tract of land which included the land in controversy here. The articles of incorporation of the Providencia Land, Water and Development Company were also introduced by the defendants; the conveyances introduced vesting the legal title to part of the tract in controversy

in J. D. Hooker and the remainder in A. E. Pomeroy, and
177 which said land is described in the complaint by two separate descriptions but the tracts therein described are contiguous to each other as shown on the map aforesaid.

A. E. POMEROY was called as a witness on his own behalf, and being duly sworn, testified as follows:

Am one of the defendants. Am familiar with the description of the property in the deeds, one to Mr. Hooker and to myself, which have been introduced here. I am acquainted with the lands. The Los Angeles river flows through those lands in its natural course, and its general course through the same is southeasterly. The Los Angeles river flows also through each one of the tracts, that is, the one conveyed to Hooker and the one conveyed to myself. The Los Angeles river flows through that portion of the Cahuenga tract which is embraced in the complaint, and also that portion of the tract of land sought to be condemned, which is within the Providencia grant, and also that portion of the tract sought to be condemned which lies within the San Rafael grant. Though one of the deeds under which we claim is made to Hooker and the other to myself, we hold both of those tracts jointly, each owning an undivided one-half in each of the tracts Mr. Hooker owns an undivided one-half of the tract, the title to which rests in me, and I an undivided one-half of that tract, the legal title of which is vested in him.

It was stipulated that the Los Feliz rancho was a Mexican grant and extended from the north patent boundaries of the city upon the west side of the river in part and in part on both sides of the river, and extends northwesterly to the eastern boundary of the San Rafael and Providencia ranchos.

At this point the ordinances introduced by the plaintiff, and hereinbefore referred to, were marked Plaintiff's Exhibits 1, 2, 3 and 4.

178 The ordinance of the council, introduced in evidence by the plaintiff and numbered 1436, new series, was here filed and numbered Plaintiff's Exhibit 1, which said ordinance was adopted by the council of the city of Los Angeles at its meeting of September 6th, 1892, and approved by the mayor September 8th, 1892, of which said ordinance the following is a copy:

*Ordinance No.* 1436.

(New series.)

An ordinance determining that the public interest and necessity of the city of Los Angeles demands the construction of a system of water works to be owned and controlled by said city, the cost of which will be too great to be paid out of the ordinary annual income and revenue of said city, and that it is the intention of the city council to have such system of water works constructed.

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. That the public interest and necessity of the city of Los Angeles demands the construction of a system of water works to be owned and controlled by the city of Los Angeles, such system of water works to be built according to the plans and specifications now on file in the office of the engineer of said city, and the cost of which is to be $526,000, which cost is too great to be paid out of the ordinary annual income and revenue of the city of Los Angeles, and that it is the intention of said council to have said system of water works constructed.

SEC. 2. The city clerk shall certify to the passage of this ordinance by a vote of two-thirds of the members of the city council, and shall cause the same to be published for two weeks in the Los Angeles Evening Express, and thereupon and thereafter it shall take effect and be in force.

179 I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles at its meeting of September 6th, 1892, by the following vote: Ayes, Messrs. Alford, Innes, McGarry, Nickell, Rhodes, Rees, Summerland, Tufts and Pres. Bonsall (9). Noes, none.

(The members voting "Aye" composing more than two-thirds of all the members of the city council.)

FREEMAN G. TEED, *City Clerk.*

Approved this 8th day of September, 1892.

HENRY T. HAZARD, *Mayor.*

(The following indorsements appear thereon:)

19680. City of L. A. *vs.* Pomeroy *et al.* Ordinance No. 1436. Plaintiff's Exhibit 1. Filed Mar. 3, 1895. T. E. Newlin, clerk, by Sherman Smith, deputy.

Ordinance of the council number 1451, new series. Plaintiff's Exhibit 2, said ordinance adopted by the city council at its meeting of October 3rd, 1892, and approved by the mayor October 4th, 1892, was here filed in evidence of which the following is a copy:

*Ordinance No.* 1451.

(New series.)

An ordinance declaring the necessity of constructing a system of water works to be owned and controlled by the city of Los Angeles, providing for the holding of a special election in the city of Los Angeles on November 2nd, 1892, for the purpose of voting for or against the issuing of bonds in the amount of $526,000 for the payment of the cost of the same; providing for the number and character of the bonds to be issued; dividing the city into election precincts; appointing polling places, inspectors, judges and clerks of election; and ordering the city clerk to publish notice of such special election.

180 Whereas, on the 6th day of September, 1892, the city council of the city of Los Angeles by a vote of more than two-thirds of all its members passed an ordinance determining that the public interest and necessity of the city of Los Angeles demands the construction of a system of water works to be owned and controlled by said city, the cost of which will be too great to be paid out of the ordinary annual income and revenue of said city, and that the amount to be expended in constructing the same is $526,000.

And whereas, said ordinance was approved by the mayor of said city on the 8th day of September, 1892, and was published for two weeks in the Los Angeles Evening Express, a newspaper published in said city; and,

Whereas, the city council of said city has had plans and estimates of the cost of said system of water works made by a competent engineer, who has had successful experience in such work, which plans and estimates have been adopted by said city council and are now on file in the office of the city clerk of said city.

Now, therefore, at this the next regular meeting of said council after such publication.

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. That the public interest and necessity of the city of Los Angeles demands the construction of a system of water works to be owned and controlled by said city and to be constructed according to the plans and specifications proposed by the city engineer and adopted by said city council the estimated cost of which system of water works is $526,000, which cost is too great to be paid out of the ordinary annual income and revenue of the city of Los Angeles; that it is the intention of the council of said city to submit to the qualified voters of said city the proposition of incur-
181 ring a bonded indebtedness of $526,000 for the purpose of paying for the construction of said system of water works.

SEC. 2. That a special election shall be held in the city of Los Angeles on November 2nd, 1892, and is hereby called on that day for the purpose of submitting to the qualified voters of said city the proposition of incurring a bonded indebtedness for the object and

purpose herein set forth. Said election shall be conducted in the manner provided for in the charter of said city and the laws of the State of California. The ballots to be used at said election shall read "For the issuing of bonds" and "Against the issuing of bonds." The polls at said election shall be opened at sunrise and close at 5 o'clock p. m. of the same day.

SEC. 3. For the purpose of said election the nine wards of the city as described in article XII of the charter are hereby divided into twelve precincts with the following boundaries and voting places, and the following officers of election are hereby appointed:

(Here follows the description of the different wards, precincts, polling places and election officers.)

SEC. 4. If the proposition be accepted by two-thirds of the qualified voters of said city, voting at said election, bonds of said city to the amount of $526,000 shall be issued for the payment of the cost of said system of water works; said bonds shall be serial in character, one-twentieth part of the whole amount of said indebtedness, together with interest due on all sums unpaid on that date, shall be paid each year. Said bonds shall be 526 in number, all to be dated January 1, 1893, and bear interest at the rate of five per cent. per annum, payable semi-annually on the first day of July and the first day of January of each year after their issue, principal and interest to be payable in gold coin of the United States and payable at the Chemical National Bank of New York City.

182 SEC. 5. There shall be levied for the first year by the city council the sum of $52,600 for the payment of principal and interest of said bonds, and for each succeeding year a sum sufficient to pay the accrued interest upon the remainder of the sum due and one-twentieth part of the principal.

SEC. 6. The city clerk is hereby directed, after this ordinance has been published ten times as herein specified, to publish for two weeks in the Los Angeles Evening Express a notice of such special election, the purpose for which the indebtedness is to be incurred, the number and character of the bonds to be issued, the rate of interest to be paid, and the amount of tax levy to be made for the payment thereof.

SEC. 7. The city clerk shall certify to the passage of this ordinance by a vote of two-thirds of the members of the city council, and cause the same to be published once a day for ten days in the Los Angeles Evening Express and thereupon and thereafter the same shall take effect and be in force.

I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles at its meeting of October 3rd, 1892, by the following vote: Ayes, Alford, Innes, McGarry, Nickell, Rhodes, Rees, Summerland, Tufts and Pres't Bonsall (9). Noes, none.

(The above comprising more than two-thirds of the members of the council of the city of Los Angeles.)

FREEMAN G. TEED, *City Clerk*,
By C. A. LUCKENBACH, *Deputy*.

Approved this 4th day of October, 1892.

HENRY T. HAZARD, *Mayor.*

(The following indorsements appear thereon:)

19680. City of L. A. *vs.* Pomeroy *et al.* Ordinance No. 1451 Plaintiff's Exhibit 2 Filed Mar. 3, 1895. T. E. Newlin, clerk; by Sherman Smith, deputy.

183 Ordinance of the council number 1717, new series, Plaintiff's Exhibit 3, adopted by the council of Los Angeles city at its meeting of June 8th, 1893, and approved by the mayor June 8th, 1893, was here filed as evidence and of which the following is a copy:

*Ordinance No.* 1717.

(New series.)

An ordinance authorizing the condemnation of certain land necessary for municipal purposes.

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. That it is necessary for municipal purposes that the following-described real property in the county of Los Angeles, State of California, be acquired by condemnation for the purpose of constructing headworks for a water system, to wit:

(Here follows a description of the two parcels or tracts described in the amended complaint and sought to be condemned.)

SEC. 2. That the city attorney is hereby authorized to institute proceedings in the name of the city against the owners of said land in the superior court of Los Angeles county for the purpose of determining the compensation to be paid the owners of said land for the appropriation thereof, and to prosecute the same to a judgment.

SEC. 3. The city clerk shall certify to the passage of this ordinance and cause it to be published once in the Los Angeles Daily Herald, and thereupon and thereafter it shall take effect and be in force.

I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles at its meeting of June 8th, 1893.

C. A. LUCKENBACH, *City Clerk.*

Approved this 8th day of June, 1893.

184 T. E. ROWAN, *Mayor.*

(The following indorsements appear thereon:)

19680. City of L. A. *vs.* Pomeroy *et al.* Ordinance No. 1717. Plaintiff's Exhibit 3, filed Mar. 3, 1895. T. E. Newlin, clerk. By Sherman Smith, deputy.

Ordinance of the council numbered 2636, new series, Plaintiff's Exhibit 4, adopted by the city council at its meeting of March 5, 1895, and approved by the mayor March the 7th, 1895, was here filed in evidence, and of which the following is a copy.

*Ordinance No.* 2636.

(New series.)

An ordinance determining that the public interest and necessity of the people of the city of Los Angeles demands the acquisition and improving of certain lands for the extension of certain public parks; also the acquisition of certain lands upon which to construct headworks for water system for said city; also the acquisition of certain land and the erection of a central police station thereon; also the erection of a public museum and library building, the cost of which improvements, and each of them, will be too great to be paid out of the ordinary annual income and revenue of said city; and declaring the intention of the city council to have and procure said improvements to be made.

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. That the public interest and necessity of the people of the city of Los Angeles demands that the following-named municipal improvements be acquired, constructed and completed to wit:

First. That land be acquired and improved for the purpose
185 of extending, enlarging and improving Westlake park in said city, the cost of which will be twenty-five thousand dollars.

Second. That land be acquired and improved for the purpose of extending, enlarging and improving East Side park in said city, the cost of which will be $25,000.

Third. That land be acquired and improved for the purpose of extending, enlarging and improving Elysian park in said city, the cost of which will be $100,000.

All of said parks being public parks of said city.

Fourth. That land be acquired in the Providencia rancho for the construction of headworks for a water system for said city, the cost of which will be $30,000.

Cross-examination:

Fifth. That certain land be acquired and a central police station erected thereon, the cost of which will be $40,000.

Sixth. The erection of a public museum and library building, the cost of which will be $50,000.

That all of said improvements will cost the total sum of $270,000, and that the cost of the same, and of each or either of them, is too great to be paid out of the ordinary annual income and revenue of said city of Los Angeles and that it is the intention of said city council to acquire the necessary land and cause said improvements to be made.

SEC. 2. The city clerk shall certify to the passage of this ordinance by a vote of two-thirds of the members of the city council, and shall cause the same to be published for two weeks in the Los Angeles

Evening Express, and thereupon and thereafter it shall take effect and be in force.

I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles at its meeting of March 5th, 1895, by the following vote: Ayes, Messrs. Ashman, Blanchard,
186 Kingery, Pessell, Snyder, Stockwell and Pres. Teed (7). Noes, none.

C. A. LUCKENBACH, *City Clerk.*

Approved this 7th day of March, 1895.

FRANK RADER, *Mayor.*

(The following indorsements appear thereon:)

19680. City of L. A. *vs.* Pomeroy *et al.* Ordinance No. 2636. Plaintiff's Exhibit 4 filed Mar. 3, 1895. T. E. Newlin, clerk, by Sherman Smith, deputy.

The defendants next called C. S. COMPTON as a witness, who, being duly sworn, testified as follows:

The defendants here introduced as evidence a paper which was presented to them from the city attorney's office as the plans and specifications and which was filed as Defendants' Exhibit A. It was a report from the city engineer to the council of date December 21, 1891. The following is a copy of the said report:

*Dockweiler's Report.*

To the honorable special committee on water supply.

GENTLEMEN: In compliance with an order from the city council of September 14th to formulate a plan and prepare estimates for a system of water works for the city of Los Angeles, I beg leave to submit the following report:

*Report.*

No new surveys were made for this work, but all the data were obtained from the records of the engineer's office, and where these data lacked perfection for this particular purpose they were
187 amended by estimation. The report can, therefore, not go into detail sufficient for the construction of such important and costly work; but will only deal with the problem in general, leaving the numerous details to be perfected whenever the work is ordered done. Nevertheless the matter presented herein will suffice to give you a clear idea of the problem before us.

As a matter of course we look first to the source of our supply, and we find that the Los Angeles river carries water enough to supply all future wants of the city. The nature of the river, however, is such that we will have to draw our supply from different parts of the stream, *i. e.*, from points at different elevations, for the river is fed by springs and other subterranean sources as it descends. We find that we may depend on a permanent supply of about thirty cubic feet per second near the head of the river, at the point where

the present supply ditch of the city receives its water, and again for a further thirty cubic feet, about at a point where the Los Angeles City Water Co. takes its supply from the river.

This will furnish the city with 60 cubic feet of water per second, or about with 38,580,000 gallons per day. Allowing 200 gallons per head per day, this will suffice for a population of 193,000 persons.

At both sites the water is best collected by subterraneous pipe lines, laid with open joints, along and below the river bed, deep enough to be secure against disturbances caused by freshets. While such an arrangement of infiltration will not furnish a means to eliminate to any considerable degree the organic impurities contained in the water, it will nevertheless act as a strainer and prevent the debris and silt, carried along by the river, from entering the pipe lines and the reservoirs.

To effectively filter the water of the river and remove from it practically all objectionable matter, special arrangements will have to be provided.

188 The water from the first source may be conducted by gravity into reservoir No. 7 at the north city limits the water level of which has an elevation of 435 feet above sea being about 155 feet above Broadway at the city hall.

The second supply may be brought by gravity, close to the city, in the vicinity of the reservoir, of the Los Angeles City Water Company, which has an elevation of 375 feet above sea, or 90 feet above Broadway at the city hall.

The sources of supply together with the decidedly undulating character of the ground upon which Los Angeles is built—the elevations varying from 200 feet to over 800 feet above the sea—not only limit but also complicate the solution of our problem.

It can at once be seen that only that part of the city can be supplied with water from the foregoing sources directly by gravity which lies below the contour having an elevation of 400 feet above sea, which part comprises but little more than one-half the area of the town; for the other half, the water has to be pumped to reservoirs of higher elevation from which the supply will then be by gravity.

Assuming the future population of the city at 200,000, it is estimated that the higher part of town will contain between fifty and sixty thousand inhabitants. Allowing them about 200 gallons of water per head per day, it will be seen that it requires the pumping of ten millions gallons per day.

The sources of supply and the location of the two main reservoirs, however, as well as the complexion of the city, make it necessary for economic reasons to divide the city into three different districts, each one being supplied by an independent system.

The territory covered by the first system, or district No. 1, shown on the accompanying map by the yellow color, embodies all that part of the city which lies below Seventh street. Its area is

189 about 5,400 acres, and its estimated population 42,000; at 200 gallons per head per day, it will require 8,400,000 gallons of

water to supply its wants, or about 13 cubic feet per second. It is supplied directly from reservoir No. 7, which will give a difference of level between the reservoir and the district, varying from 150 feet to 250 feet, or an available pressure in the mains varying from 50 pounds to 90 pounds per square inch. It may be observed that this pressure will suffice for fire purposes in this district, and that the latter can therefore be well taken care of by direct gravity from reservoir No. 7.

The second district comprises all the country lying above the contour having an elevation of 350 feet above the sea, and Boyle Heights to Louisiana avenue. It is colored blue on the map. Its area equals nearly 9,000 acres, or about half of the city. Its final population is assumed at 58,000 persons. Allowing 200 gallons per person per day it will be seen that its requirements are 11,600,000 gallons of water per day, or nearly 18 cubic feet per second. About 5,000 acres of this district lies west of the river, and the remaining 4,000 acres east of it.

The water required by these two areas may be proportioned according to the land to be supplied, *i. e.*, that part of the second district lying west of the river requires about 6,240,000 gallons per day, while that part lying east of the river will have to be supplied with 5,260,000 gallons per day. None of this district can be directly supplied from either reservoir. It is, therefore, necessary to pump the water first to a reservoir of sufficient elevation to overcome the high altitude of the ground.

It is thought impracticable to raise the entire amount of water required for the district to such an elevation, that every part of the district could be reached; for some of the hills have an altitude of over 800 feet above the sea, or more than 400 feet above
190 reservoir No. 7. To raise even a moderately large body of water to such a height is extremely expensive. It is therefore assumed that the water for the district is pumped only to an elevation of 600 feet above sea. A reservoir at this elevation will cover about 8,000 out of the 9,000 acres, leaving unwatered about only 600 acres of Elysian park, and about 400 acres near the northeast corner of the city.

The small amount of water required for this territory may be furnished by a separate and inexpensive pumping plant from the high level reservoirs.

The six million gallons required west of the river in this district will have to be pumped directly from reservoir No. 7 into a reservoir 200 feet higher, from where a gravity system will furnish the supply.

The hydraulic head obtained in this district will be from 50 to 250 feet, or an available pressure in the mains from 20 pounds to 90 pounds per square inch, which will furnish ample fire pressure in all parts.

The five million gallons of water required for the high level districts lying east of the river will be taken out of the main supply conduit leading to reservoir No. 7, before it reaches the latter, perhaps at or near the point where zanja 9 E now receives its supply

from the main supply ditch. This supply can be led to a convenient point on Downey avenue, near reservoir No. 5, to an elevation of 400 feet above sea, into a small receiving reservoir or well, from where it will have to be pumped up to the required elevation of 600 feet above sea. From here that part of the high level district lying east of the river will be supplied by a gravity system. The extreme difference of level between this last reservoir and the lowest part of the district about along Louisiana avenue at Boyle Heights
191 will be 300 feet; giving an extreme available pressure in the mains of about 110 pounds per square inch.

It will be noticed that the low level and the high level districts are furnished from one common source, and will consume all the water available at the head of the river.

The third district comprises all that part of the city lying north of Seventh street, east and south of Beaudry avenue, Adobe street, Buena Vista street and the Santa Fe R. R. tracks to Pasadena, Wall street and Patrick street, thence along Hansen street down Kuhrtz to Workman street, thence along Workman and Echandia streets, thence along the bluff parallel to Boyle avenue to Seventh street.

It will be seen that this district comprises all of the business part of the city, and that which may be devoted to the manufacturing purposes on both sides of the river.

This district contains about 3,500 acres, and is assumed to have a population of 10,000 persons. Allowing each person 200 gallons of water per day the district will require 20 millons per day, or nearly 31 cubic feet per second, the total available supply at the second source of the river.

As has been stated before, the water may be brought near the city to an elevation of 375 feet, or about 95 feet above Broadway at the city hall. The entire district lies below the 350-feet contour, with the exception of the Bunker Hill Avenue region, which contains about 150 acres. Almost the entire district can, therefore, be reached from this reservoir for ordinary purposes, however the extreme difference in elevation between the reservoir and the lowest part of this district along Seventh street below Alameda, would only be 135 feet, giving an available pressure at that place of perhaps not more than 50 pounds per square inch; at the city hall the effective pressure would not be much more than 30 pounds per square inch. It is, therefore,
192 very apparent that this system will furnish directly no protection against fire; for fire pressure in the business and manufacturing parts of the city should perhaps not be less than 85 pounds per square inch, while 40 pounds per square inch will suffice for the resident portions. It is therefore necessary to create this heavy pressure artificially by pumping the water to an adequate elevation of 550 feet above sea. This altitude will give an available pressure at Bunker Hill and Temple street- of about 50 pounds per square inch; at the city hall of about 100 pounds per square inch; at First street and the river about 110 pounds; at Seventh street and the river about 120 pounds per square inch, at the fire-hydrants.

It will be seen, therefore, that for over two-thirds of the city or three-fourths of her final population, the water needs to be raised from 180 to 200 feet, in order to obtain pressure sufficient for fire purposes, and that it requires three separate pumping plants to accomplish this. It has also been shown by the foregoing that about one-half of the area of the city or two-thirds of the assumed population can be supplied directly from the two principal reservoirs with water for domestic purposes at low pressure, out of which area about 6,000 acres, with a population of 42,000 persons, are incidentally furnished with fire pressure.

The central district, called district No. 3, or the business portion of the city, then, is the only portion which will have to be supplied with extensive pumping plants solely for fire purposes.

The general arrangement of the system is somewhat pointed out by the capacity of the two principal reservoirs.

On account of the steep slopes of the ground at or near the reservoir of the Los Angeles City Water Company, a large storage reservoir can only be obtained at a heavy expense. It is therefore thought best not to attempt the storing of water at that
193 site to any considerable extent. One day's supply is all that can here be provided for at a moderate cost.

Reservoir No. 7, however, furnishes the means for ample storage. The water in it, raised to a depth of 30 feet at the lower dam, will cover an area of 75 acres, and amount to 365 million gallons. This would contain a supply for about 18 days for a population of 200,000, allowing each person 100 gallons per day. It will be seen, therefore, that the city can be well protected against the evils resulting from possible accidents to the headworks and pumping plant of district No. 3, or even to the headworks and supply conduits of both systems, No. 1 and No. 3. To make provision for such an emergency the main pipe of district No. 1 is made large enough and so located as to enable one to adequately supply through it, also district No. 3. It will be observed, on the accompanying map, that the main for district No. 1 lands at Seventh and Pearl streets, and is then carried down Seventh street to supply all the territory south of it; but at the same time connections are provided with all the mains pointing toward Seventh street and lying in the streets running north and south in district No. 3.

Now, if anything happens to the supply works of district No. 3, all that is necessary to be done in order to furnish water in this district is the opening of the gates at Seventh street, of the several mains belonging to district No. 3, closing at the same time the main gate at the reservoir of the latter system.

The repairs of the supply works of the impaired system can now be made without interfering with the daily supply in any part of the city. On the other hand, if reservoir No. 7 should fail, or the supply works belonging to it were destroyed, the gates of district No. 3 at Seventh street could be opened and district No. 1
194 would receive its supply from district No. 3, and if the latter district was provided with a high level reservoir, district No. 2 could also be provided for from district No. 3 in case of need.

Of course, in case of either emergency, as assumed above, the actual supply is only one-half of that, as when both supply works are in operation, but in either case, we will have 20 million gallons per day for a population of 200,000, or 100 gallons per person per day, which is ample for domestic purposes, and, with proper restrictions, also for all purposes during the repair of the works.

A system of this kind, as can readily be conceived, will be very efficient, and nothing can be urged against it, except the necessarily large annual expenditure which its operation would entail.

The supply conduits to the reservoirs and the pipes for the entire city have been proportioned for a daily supply of 200 gallons per person. At present the consumption is about 120 gallons per day per person.

It may appear, therefore, to some, that the assumption for a consumption of 200 gallons per head per day is quite excessive, but it must be remembered that in cases of conflagration, the capacity of the pipes should not only be sufficient to furnish ample water to extinguish fires, but at the same time yield the usual supply to the consumers.

However, the minimum size of the pipes, even if adapted to the foregoing data, should not be too low; the preferable minimum size in my judgment is six inches, which may, perhaps, be reduced with a high-pressure system to five inches, and this size should only be used in side streets, and the residence portion of the town.

The minimum size for the business streets ought to be put at eight inches.

Below will follow an estimate of the system as outlined before.

195 To recapitulate the requirements of the system and to give an approximate of its cost, we have—

I.

| | |
|---|---|
| Headworks at upper source | $40,000.00 |
| 48-in. supply conduit to reservoir No. 7 | 96,000.00 |
| Dams and reservoirs, No. 7 | 45,000.00 |
| Total | $181,000.00 |

II.

District No. 1.

| | |
|---|---|
| 30-in. main to 7th and Pearl, 24-in. to Main street on 7th; 20-in. on 7th to river | $228,000.00 |
| Secondary mains in streets | 385,000.00 |
| Total | $613,000.00 |

The present requirements of this district could, perhaps, be met with an expenditure of $470,000.00.

III.

District No. 2.

A—West river:

| | |
|---|---|
| High level reservoir, capacity two and one-half million gallons | $18,000.00 |
| Two six-million-gallon pumpings and plant | 76,000.00 |
| Force-main, gates, etc., etc | 13,500.00 |
| Principal main 16-in | 32,000.00 |
| Secondary mains | 120,000.00 |
| Total | $259,500.00 |

Daily expense of pumping (coal at $8.00 per ton), $65.00.

B—East river:

The approximate cost of this system will be about the same
196 as that west of the river, provided the water is pumped from reservoir No. 5.

| | |
|---|---|
| Cost | $260,000.00 |
| Daily cost of pumping at | 58.00 |

Total cost of district No. 2.

| | |
|---|---|
| 1 | $259,500.00 |
| 2 | 260,000.00 |
| Total | $519,500.00 |

Total daily expense of pumping, $123.00.

The present requirements of this district could be met with at an outlay of about $300,000.00, with a daily expenditure for pumping of $60.00.

To this has to be added $181,000.00 for the headworks and reservoir.

District No. 3.

| | |
|---|---|
| Headworks at lower source | $40,000.00 |
| 48-in. supply conduit to reservoir | 94,000.00 |
| Low-level reservoir | 35,000.00 |
| High-level reservoir | 30,000.00 |
| Force main | 30,000.00 |
| Two twenty-million-gallon pumps and plant | 250,000.00 |
| Mains, and secondary mains | 1,160,000.00 |
| Total | $1,639,000.00 |

The daily expense of pumping would amount to $175.00.

The present requirements could be met with, by an outlay of $1,250,000.00, with a daily expense of pumping of about $95.00.

The total cost, then, of the entire system, *i. e.*, for a population of 200,000 persons, supplied with water at the rate of 200 gallons per head per day, exclusive of rights of way, of lands for the reservoirs,

of fire-hydrants, water meters, and pressure regulators would amount to:

| | | |
|---|---|---|
| 197 | Upper headworks and reservoir No. 7 | $181,000.00 |
| | First district | 613,000.00 |
| | Second district | 519,000.00 |
| | Third district | 1,639,000.00 |
| | Total | $2,952,000.00 |
| 1. | Total cost of all districts | $2,952,000.00 |
| 2. | Filters | 225,000.00 |
| 3. | Repairs to streets | 100,000.00 |
| | Total | $3,277,000.00 |

Total daily expense for pumping, $298.00.

Fire-hydrants put in place are worth about $60.00 per piece; water meters about $25.00, and pressure regulators about $25.00 per piece.

After the system has been thoroughly equipped with these fixtures, and the price for land, and the incidentals having been added, it will be readily seen that the cost of the works will not fall short of four million dollars.

An outlay of two and a half million dollars, with a daily expenditure of about $155,000 for pumping, will satisfy all present wants.

While it may appear that the system as outlined above is rather expensive in the first instance, and also subject to heavy annual expenditures for its operation, it must be remarked that the cost is not at all excessive when compared with other first-class water works of cities similarly situated as Los Angeles; also, that if provided with such a system, our city must be ranked with the first in the country in respect to a thorough water supply.

As has been stated before, for the lack of exact and sufficient data, the foregoing estimates are merely rough approximations, probably in the aggregate approaching the true cost very nearly, and only intended to give your honorable body an idea of the magnitude of the work before us.

198 A second plan.

As has been asserted, the plan described in the foregoing pages embodies the principal features of a first-class system of water works.

The amount of water proposed to be furnished by it is quite abundant, and the pressure throughout the city adequate for all purposes and emergencies. Particularly the most valuable and most densely populated part of the city, including all the land, which will perhaps be devoted to manufacturing purposes, is lavishly provided with water under high pressure. It is only natural that such a system should be costly in the first instance, and be encumbered with heavy annual operating expenses.

To maintain a system of water mains under a permanent press-

ure of 100 pounds per square inch, and over, which pressure is only required occasionally, and then only for a short period, for the extinguishing of fires, seems a great waste of power, and hence of money, when we remember that half of that pressure will suffice for all ordinary purposes, for by far the largest part of the time. For it must be remembered that all this waste power, lying idle in the mains, is created artificially at great expense.

It is the object of the following pages to describe a plan by which this waste of power may be avoided, and the great bulk of the annual expenses for operation be saved.

This is accomplished by the abolishment of the permanent high pressure in the system of the district No. 3, and by providing it for ordinary consumption only with low pressure such as will be secured from the reservoir by direct gravity, and employ high pressure then only when it is needed in case of fire.

This can be done by dispensing with all the costly pumping machinery of district No. 3.

199 It will be remembered that the water from district No. 2, about 12 million gallons per day, has to be pumped to an elevation of 600 feet above sea, from reservoir No. 7, into a separate reservoir. Instead of providing two pumping stations for district No. 2, as stated in the first plan, viz: one at reservoir No. 7 and one at reservoir No. 5, we provide only for one station at reservoir No. 7, and lead the water to the high level district across the river by a special main.

The high-pressure main may follow Effie street and cross the low-pressure main of district No. 3 at or near the distribution reservoir of district No. 3 in Solano cañon, or on Buena Vista street.

At this crossing both mains are provided with gates, so that the high pressure from the reservoir No. 2 may be transmitted to system No. 3 simply by the simultaneous raising and lowering of two gates, which can be done by a single person who is especially engaged for that purpose, and who is in constant connection with the head office of the fire department and its alarm system.

The water drawn by districts No. 2 and No. 3 during a fire would therefore come directly from the high-level reservoir, located near reservoir No. 7, and fed by pumping engines from the latter. For this reason the high-level reservoir will have to be made larger than if it were only intended to supply district No. 2, and it will only be prudent to provide also for plenty of power for pumping purposes at reservoir No. 7.

This plan, as will be seen by the estimates below, is cheaper in the first instance than the one described first, and considerably so, when we come to compare the annual operating expenses. The disadvantage of this system over the former, consists in the circumstance that district No. 2 could not be directly supplied from district No. 3 in case of accident to reservoir No. 7, or the headworks belonging to it.

200 District No. 1, however, would be just as favorably situated in respect to receiving its supply from district No. 3 as in the first plan. And to provide against the chance of district No. 2

being left without a supply, a reserve pump could be stationed in the plant at reservoir No. 7, which would pump water from the reservoir of district No. 3 to reservoir No. 7, should an accident occur to this reservoir, the regular pumping plant would then lift it further to the high-pressure reservoir.

The lift from reservoir of district No. 2 to reservoir No. 7 is only 35 feet.

A comparatively inexpensive reserve pumping engine would, therefore, suffice to guard against all probable emergencies.

Another disadvantage to which this latter system will be subjected is the lessening of water pressure for motor purposes in the business and manufacturing portions of the city. For the great amount of power created at the pumping station of district No. 3 is transmitted to all parts of the district, and can be utilized by a great number of small motors, so long as the water so used was not required for other purposes.

But it may also be argued that if the demand for power for small motors would ever warrant the great annual expenditures of a powerful central plant, this plant could then, or at any other time, be created, if the demanded power could not indeed be furnished cheaper by gas engines, or by compressed air, supplied from a central station or last at least by a central electrical plant, or even by separate electrical apparatus.

The disadvantages, therefore, dwindle down to almost nothing, and the last plan appears to me the more desirable.

To prevent the danger of bursting the plumbing fixtures within buildings where the pressure resulting from a temporary or permanent high-pressure system is great, and also to evade the dangers and annoyances due to sudden and violent variations of
201 pressure, it is necessary, as indicated before, to provide such buildings with a pressure regulator.

Perhaps not less than one-half of all taps of the city would have to be thus protected.

A further requirement for the safe and economic administration of the water system will be the metering of all taps where unjust methods are employed by one consumer to gain advantage over others. Therefore we may assume that finally one-half of the taps are to be metered.

The expense incurred by metering is always found a good investment.

The general arrangement of this plan is seen on the accompanying blue print. The estimate is as follows:

I.

| | |
|---|---|
| Headworks at upper source | $40,000.00 |
| 48-in. conduit to reservoir No. 7 | 96,000.00 |
| Dams and reservoir No. 7 | 45,000.00 |
| Total | $181,000.00 |

II.

District No. 1.

| | |
|---|---|
| 30-in. main to Seventh street, 24-in. main to Main street; 20-in. main to river | $228,000.00 |
| Secondary main in streets | 385,000.00 |
| Total | $613,000.00 |

Of this for the present $470,000.00 is required.

District No. 2.

(Inclusive of power for high pressure for district No. 3.)

| | | |
|---|---|---|
| | High-level reservoirs, capacity 7 million gallons | $50,000.00 |
| 202 | Two 10-million-gallon pumps and plant | 120,000.00 |
| | Force mains, etc., etc | 88,000.00 |
| | High-pressure main on Effie street | 120,000.00 |
| | Secondary mains | 250,000.00 |
| | Reserve pump | 25,000.00 |
| | Total | $648,000.00 |

Daily expenditure for pumping, $95.00.

An outlay for the requirements of the present would amount to about $438,000.00, exclusive of $181,000.00 for headworks for reservoir No. 7, with a daily expenditure of $65.00.

District No. 3.

| | |
|---|---|
| Headworks at lower source | $40,000.00 |
| 48-in. supply conduit | 94,000.00 |
| Reservoir | 35,000,00 |
| Mains and secondary main | 1,160,000.00 |
| Total | $1,229,000.00 |

No pumping.

The present requirements can be met with $840,000.00.

The total cost, then, of this system, exclusive of rights of way, cost of land for reservoirs, of fire-hydrants, meters, and pressure regulators, will be:

| | |
|---|---|
| 1 | $181,000.00 |
| 2 | 613,000.00 |
| 3 | 648,000.00 |
| 4 | 1,229,000.00 |
| 5. Filters | 225,000.00 |
| 6. Repairs of streets, etc., etc | 100,000.00 |
| Total | $2,996,000.00 |

With a total daily expenditure for pumping of $95.00. Of this the present would require:

| | | |
|---|---|---|
| 203 | 1 | $181,000.00 |
| | 2 | 470,000.00 |
| | 3 | 438,000.00 |
| | 4 | 840,000.00 |
| | 5. Filters | 100,000.00 |
| | 6. Repairs of streets | 50,000.00 |
| | Total | $2,079,000.00 |

With a daily pumping expense of $65.00.

To compare the two plans described we have:

I.

| | |
|---|---|
| (First plan complete, total cost | $3,277,000.00 |
| *a* (Daily expense for pumping | 298.00 |
| (Second plan complete, total cost | $2,996,000.00 |
| *b* (Daily expense for pumping | 95.00 |

II.

| | |
|---|---|
| (First plan to meet present needs | $2,500,000.00 |
| *a* (Daily expense for pumping | 155.00 |
| (Second plan to meet present needs | $2,079,000.00 |
| *b* (Daily expense for pumping | 65.00 |

It is understood that these estimates do not include the cost of right of way or land for reservoir sites of fire-hydrants, meters and pressure regulators. Adding to each of the estimates $100,000.00 would provide for about 1,000 meters and 1,000 pressure regulators and 1,000 fire-hydrants, which will perhaps be sufficient for the present requirements.

From these figures it will — seen that the second plan is by far the cheaper, and since its merits equal those of the first pretty nearly, if not entirely, it is the more preferable of the two.

The estimates for the mains were based on cast-iron pipe at a cost f. o. b. at Los Angeles of $44.00 per ton, which is the price quoted at present. It must be remarked that this is a very low figure and that it may go up at any time, and reach the usual
204 figure of $55.00 or even $60.00 per ton, which rise would swell the estimates considerably, for the total amount of pipe required reaches the weight of over 30,000 tons. A rise of $10.00 per ton would cause an increase in the estimates of $300,000.00, an amount sufficient to build works required at present for the high-level district west of the river, including the necessary headworks, and the dams or reservoir No. 7. So if anything is to be done in the line of building water works, now seems to be the time to do it.

Respectfully submitted,

J. H. DOCKWEILER,
*City Engineer.*

Los Angeles, Cal., Dec. 21st, 1891.

(The following indorsements appear thereon:)
Water-works system. 19680. City of L. A. *vs.* Pomeroy, *et al.* Report of city engineer. Defendants' Exhibit A. Filed Mar. 4, '96. T. E. Newlin, clerk, by Sherman Smith, deputy.

(Here follows a map of the city showing the above districts.)

The said plans are the same that are referred to in the Minutes of the Council, volume 36, page 343, of date October 3rd, 1892, and the specifications were here introduced in evidence by the counsel for the plaintiffs and marked Plaintiff's Exhibit 5, and of which the following-is a copy:

*Specification for Cast-iron Pipes for the New Water Supply of the City of Los Angeles.*

The metal from which the pipes are to be cast shall be made without any admixture of cinder iron, or other inferior metal, and shall be remelted in the cupola or air furnace. It shall be of such character as to make the pipes strong, tough and of even grain that
205 will satisfactorily admit of drilling and cutting, and shall possess a tensile strength of at least 16,000 lbs. per square inch.

Specimen rods of the metal used, of a size and form suitable for a testing machine, shall be prepared for the city engineer when required. These specimen rods shall be poured from the ladle at any time, either before or after the pipe has been poured, as may be required, and shall present a true specimen of the iron used for making the pipes. The outside skin of the test piece shall be turned off in a lathe, leaving only the normal iron inside.

Each pipe shall be 12 feet in length from the bottom of the hub to the end of the spigot.

Each pipe shall have cast on its exterior surface in raised roman letters and figures 1½ inches long the name of the maker of the pipe and the year.

The pipes shall be of the hub and spigot pattern and shall practically be truly cylindrical and truly circular in section, having the inner and outer surfaces concentric.

Particular care is to be paid to the hubs that they are of the required size. The hubs and spigots will be tested by circular gauges and no pipe will be accepted which is defective in joint room or too large, from any cause whatever.

All special castings shall be made according to such drawings and instructions as will be given by the engineer from time to time.

The weight of the straight pipe shall closely average as follows:

| | | | | | |
|---|---|---|---|---|---|
| 4 | 22 | 14 | 105 | 24 | 242 |
| 6 | 35 | 16 | 129 | 27 | 293 |
| 8 | 50 | 18 | 153 | 30 | 350 |
| 10 | 68 | 20 | 181 | 33 | 411 |
| 12 | 84 | 22 | 210 | 36 | 478 |

No pipe shall be received the weight of which shall be less than the above-specified weight by five (5) per cent.; and no ex-
206 cess of weight of more than three (3) per cent. above that just specified will be paid for.

After the asphalt coating becomes hard the contractor shall have all pipes and special castings weighed at the foundry at his own expense and under the supervision of the city engineer, should he deem it advisable to do so; after which the weight of each pipe or special casting shall be conspicuously and clearly painted in white on the outside.

The straight pipe shall be cast in dry sand mould, in a vertical position, with the hub end down; and the curved pipes in loam.

The flasks of all pipes shall be allowed to remain in position a sufficient length of time to prevent unequal contraction during the cooling process.

The castings of all kinds shall be smooth and round, without depressions, lumps, swells, scales, blisters, sand holes, cracks and defects of every nature. No plugging or filling will be allowed. The castings shall be thoroughly cleaned and no lumps or rough places shall be left in the barrels or hubs before they are coated.

Should the inspector find in any one place a variation in thickness of more than ten (10) per cent., either greater or less, from that specified in the contract, such pipe shall be rejected.

All pipes must be subjected to a hydraulic pressure of three hundred (300) pounds per square inch and hammer-tested while under that pressure.

All castings, after having been cleaned without the use of acids or other liquids, shall be carefully coated with asphalt or coal-pitch varnish, in the discretion of the city engineer.

Any casting that is to be recoated shall first be thoroughly scraped and cleaned.

All the pipes and other castings contracted for must be delivered on the works in all respects sound and conformable to the contract. The inspection will not relieve the contractor of any of his obli-
207 gations in this respect; and any defective pipe or other casting which may have passed the inspector at the works, or elsewhere, will, at all times, be liable to rejection when discovered until the final adjustment and completion of the contract.

The contractor shall furnish the city engineer two wrought-iron rings, male and female templates; the one showing the outside diameter of the spigot end, and the other the inside diameter of the hub end of each size pipe; and the said pipe shall conform to the respective templates.

Care must be taken, in handling the pipes, not to injure the coating; and no pipes or other material of any kind shall be placed in the pipes during transportation, or at any other time, after they receive the coating.

*Specifications.*

For the construction of earthen dams and other works for reservoirs for the proposed new water supply of the city of Los Angeles.

*Dimensions.*

The dams are to be built in accordance with the plans, profiles and detail drawings on file in the office of the city engineer. The dimensions are top width 20 feet; outer slope 2 horizontal to 1 vertical; inner slope on water side, 3 horizontal to 1 vertical. The length of the dam on top will be about 440 feet, and its greatest depth at surface of ground about — feet. The top of the dam is to have a slope of 3 inches from its inner to its outer edge.

*Preparing the Site of the Dam.*

All brush, grass, weeds, etc., shall be cleared from the site of the dam and removed or burned within five (5) days from the time of beginning the work. Then the top soil, containing roots and other perishable matter, as well as all gravel and sand, is to be ex-
208 cavated and removed from the whole base of the dam, which is to be left rough, but cleared of all perishable material.

If the soil so removed, after being cleared of roots and all other perishable material, is, in the opinion of the city engineer fitted for the work, it can be used on the outside part of the outer slope of the dam; but it must be deposited in regular layers, as hereinafter specified.

*Puddle Trench.*

A puddle trench is to be cut through the entire length of the center line of the dam, from a point two feet above high-water mark on one side to a point to above high-water mark on the other side. This trench must be taken down to an impermeable stratum.

The trench, both longitudinally and transversely, must be cut into steps with sloping sides, as shown on drawings. The trench is to be filled with puddle in the same way as that specified for the puddle wall below.

*Puddle. Puddle Wall.*

The puddle wall is to be made in continuation of the filling of puddle trench. Its dimensions are to be 10 feet in width at 2 feet above high-water level of reservoir and to batter down on each side, at the rate of 1 horizontal to 8 vertical, to the ground level. The cross-section of puddle trench will be fixed after the ground is opened out.

The trench is to be filled with puddle in six-inch layers up to the ground level and each layer of the puddle in trench and puddle wall is to be completed before placing another layer.

Above the ground level each layer of the puddle wall is to be brought up at the same time as the layer of the embankment on same level.

209 The puddle is to be composed of good clay or of good clayey soil. It may, however, have gravel thoroughly mixed with it, up to 25 per cent. of the whole mass.

The puddle is to be laid in layers of six inches and is to be well spaded, wetted, worked up and rammed; and it is to form a good junction with the bottom and sides of the puddle trench and also with the sides of the embankment where they join on with the puddle wall.

The puddle is not to quake, when being rammed; nor is it to contain too much water. Any layer, or part of a layer, which, in the opinion of the city engineer, fails in these respects, must be at once removed and replaced with good puddle.

The clay used for puddle must be free from leaves, grass, weeds, roots, brush and all other perishable material.

Particular attention is to be paid to the ramming of the layer of puddle immediately in connection with the bottom and sides of the trench.

No part of the surface of the puddle shall be exposed long enough to the air to cause it to dry before another layer is placed on it.

*Embankment.*

Where material for the embankment is taken from the side of the reservoir, it must be excavated in accordance with the lines laid down and depths given by the city engineer. When, however, the city engineer deems it advisable to do so, excavation must be stopped over part, or the whole, of the reservoir site and, in this case, the contractor must provide material outside of the reservoir to complete the work.

With the exception of the puddle, the material composing the embankment must be good clayey loam, free from too great an admixture of sand or gravel.

210 The embankment is to be brought up in layers of six (6) inches in thickness, which are to incline towards the center of the dam at a slope of about 1 in 50, as shown on the drawings.

All large lumps of earth are to be broken up before the layer is rolled.

Each layer is to be completed to its full width and depth before placing another layer. Layers are not made in irregular patches, but each layer is to be carried on continuously to its full width and depth until it is completed. Particular attention is to be paid to making each layer the full width at one time and not to have it too narrow, which would require additional filling afterwards.

Good, selected, retentive material shall be laid at the back and front of the puddle wall and of a thickness on each side of at least ten feet. The next best material is to be used in the inner slope.

All rock is to be used on the outer part of the outer slope.

If a completed layer is too dry, it shall be wetted before placing a new layer. On the completion of a layer it is to be sprinkled, if required, and then rolled, at least three times, with a grooved roller, weighing at least three tons.

The scrapers and loaded carts must not confine themselves to one track, but must travel, at different times, over the entire width of the dam in order the better to consolidate its whole mass.

The outer edges of each layer, which cannot be reached by the roller, are to be well rammed with heavy rammers.

To provide for settlement the top of the dam shall at its deepest part, be made one (1) foot higher than its intended height and it shall slope in a straight line, on each side, from this top to the ends of the dam.

The whole of the inner slope shall be covered with four (4) inches in depth of good asphaltic concrete; the depth to be measured at right angles to the plane of the slope.

211 *Waste-weir or Waste-pipe.*

The waste-weir and by-wash, or waste-pipe, as may be required, shall be constructed as shown on the detailed drawings in the office of the city engineer.

*Reservoir Inlet and Outlet Tunnels, Tower, and Foot-bridge.*

The inlet and outlet tunnels of reservoir shall be constructed in accordance with the drawings and specifications in the office of the city engineer.

The outlet pipe from the tower with all its necessary valves and fittings shall be carried through the tunnel and the proper connections of tower with tunnel, etc., the stopping block of masonry in tunnel, the foot-bridge from embankment to tower, the stonework, brickwork, woodwork, ironwork, concrete, and all other work required on the reservoir shall be carried out in accordance with the detailed specifications and drawings on file in the office of the city engineer. All work shall be executed in a thorough and workmanlike manner and all the material must be of good quality and subject to the approval of the city engineer.

*Reservoir in Excavation.*

All excavation shall be done in accordance with the lines and grades given by the city engineer and the material to be disposed as he may direct.

The walls of the reservoir shall be neatly trimmed to line.

When any perishable material or badly decomposed rock is found, such material shall be removed below the proposed lines and grades if the engineer deems it necessary; and such excavation shall be refilled with good gravel or concrete, as the case may require.

212 When necessary the walls and floor shall be covered with a coating of cement, mortar, or concrete, or asphalt concrete, or both, in order to make the reservoir absolutely water-tight.

The foregoing specifications adopted by the council of the city of Los Angeles at its meeting of October 3rd, 1892.

FREEMAN G. TEED, *City Clerk*,
By C. A. LUCKENBACH, *Deputy*.

*Specifications for Pumping Plant.*

The pumping and steam plant is to be of such detail design as may be decided upon by the city engineer and approved by the council. It must fulfill at least the following requirements:

1. One pumping engine must be capable of delivering three millions of U. S. gallons of water *per diem* of 24 hours against a head of 100 feet.

Also one pumping engine capable of delivering two millions U. S. gallons of water *per diem* of 24 hours against a head of 225 feet.

Piston speed in neither case to exceed 110 feet per minute.

2. The pumping engines and boilers, as a plant, must give a duty of 95 millions foot-pounds for each 100 pounds of coal consumed, with a steam pressure of not to exceed 85 pounds per square inch.

The foregoing specifications adopted by the council of the city of Los Angeles at its meeting of October 3rd, 1892.

FREEMAN G. TEED, *City Clerk*,
By C. A. LUCKENBACH, *Deputy*.

*Specifications*

For headworks and filtration pipe in Los Angeles river for the new water supply of the city of Los Angeles.

The gate-house valves, filtration pipes and other works required in the Los Angeles river are to be constructed in accordance with the drawings on file in the office of the city engineer.

213 The trenches for the pipes shall be excavated to line and grade as given by the city engineer and to such a width at bottom as will leave ample space for placing the broken stone or gravel on each side of the pipes.

The pipes shall be 16 inches in diameter, or such other diameter as the city engineer shall determine, and shall be laid with dry joints and properly bedded on the sand, after which broken stone, to pass through a ring two inches in diameter, shall be laid of the width and depth and in the manner shown on the drawings. The inspection hole shall be formed of 12-inch pipe, also laid dry and fitted with covers as shown on drawings.

All work shall be executed in a thorough and workmanlike manner; and all the material must be of good quality and subject to the approval of the city engineer.

The foregoing specifications adopted by the council of the city of Los Angeles at its meeting of October 3rd, 1892.

FREEMAN G. TEED, *City Clerk*,
By C. A. LUCKENBACH, *Deputy*.

*Specifications*

For brick of concrete conduit for the proposed new water supply of the city of Los Angeles.

The brick or concrete conduit, as may be determined, shall be constructed in all respects in accordance with the specifications for brick and concrete sewer-work, as adopted for the outfall sewer of the city of Los Angeles, which are on file in the office of the city engineer.

Approved:
J. H. DOCKWEILER,
*City Engineer.*

Los Angeles, Cal., Sep. 1st, 1892.

Approved:
P. J. FLYNN,
*Consulting Engineer.*

The foregoing specifications adopted by the council of the city of Los Angeles at its meeting of October 3rd, 1892.
FREMAN G. TEED, *City Clerk*,
By C. A. LUCKENBACH, *Deputy.*

214 (The following indorsements appear thereon:)

19680. City of L. A. *vs.* Pomeroy *et al.* Special specification. Plaintiff's Exhibit 5. Filed Mar. 4, 1895. T. E. Newlin, clerk; by Sherman Smith, deputy.

Specification for new city water supply for Los Angeles city.

(Filed in and with an envelope containing the following indorsements upon it.)

Special specifications for new water supply adopted October 3rd, 1892. 19680. City of L. A. *vs.* Pomeroy, Plaintiff's Exhibit 5. Filed Mar. 4, 1896. T. E. Newlin, clerk; by deputy.

Mr. Compton, being still on the stand, is asked to explain the maps and he answered: These are maps and profiles that I found on file in my office, that purport or indicate that they are plans for tunnels and filtration galleries on this ground proposed to be condemned. These plans are dated January, 1893. The other presented to him is dated February, 1893. The two taken together refer to the same thing. They are just illustrations of the different parts of the same plan.

Q. Have you any other plans or specifications in your office as city engineer of Los Angeles city upon which is set forth the character of the works, and where to be located upon this land sought to be condemned, for the purpose of obtaining a supply of water for the city of Los Angeles?

A. I have plans that are enlarged upon. Plans that I have found on file in the office that I have made for the purpose of this suit. They were enlarged upon under instructions of the city coun-

cil. There are no alterations or departures from those plans that I know of nor any omissions that I could state. I can produce the plans. And they were introduced by the defendants, the one dated in January, 1893, and marked on the back "No. 15" was filed in evidence as Defendants' Exhibit B; the other marked "No.
215 14, borings on Providencia rancho near Los Feliz line," and dated February, 1893, was introduced in evidence and marked Defendants' Exhibit "C." These are "B" and "C" of defendants' exhibits and marked profile of well-borings No. 15 and 14.

The enlarged plans referred to by the witness, or a draft of them, was made on tracing cloth and is the original. It was made within the last month, during February, and for the purposes of this suit, to illustrate our proposed plans here at the headworks. This is a map showing the location of our proposed tunnel and filtration galleries; also the map is extended, and shows the necessity for these locations and why they should be located at these points.

Q. How does these tunnels and filtration galleries correspond with those on the two maps which I have just had marked "B" and "C" and being the same marked on the back, one of them No. 14 and the other 15?

A. In regard to the location, the identical location of the plans, I couldn't state positively, excepting by an inspection of those plans; but it is my opinion that, from the inspection of those plans, the tunnel line from this point to that point (indicating on the plans) on that plan and this plan are almost identical. That is as far as the tunnel extends on these plans. They are an enlargement and addition and a continuation to it. They were intended to be a delineation of the same tunnel and a continuation of it. These maps are simply an attempt to portray on paper just what is exactly surveyed. The maps should indicate the location. The witness continuing testified: I made those maps from surveys that were made by men whom I authorized to make surveys and the map was made by my draughtsmen. It is not a copy of the plans introduced here on a larger scale. I don't know who made the map, or drafted the plan that is annexed to the complaint in this
216 action. I have examined it and have examined these diagrams by inspection. I don't know how the measurement corresponds with the plans that have been offered here, numbers 14 and 15, only by inspection as I would compart the two maps. The length of the main tunnel on the plans which I have prepared within the last month for the purposes of this trial, is 6,061 feet.

Cross-examination.

By Mr. DUNN:

The witness testified: The plans upon which I have been examined here are an elaboration of the general scheme for this water supply, and are made for the purposes of elaborating and explaining the possibilities and probabilities of the works that will be constructed upon the land which is sought to be condemned.

Redirect examination:

Have been city engineer since January, 1895. Had nothing to do with preparing the plans originally. My information from which I elaborated those plans I obtained from the plans and notes on file in the city engineer's office that have been introduced here. There are other plans and details for this system in the office of the city engineer, which were there at the time I went into office and haven't been introduced here.

C. A. LUCKENBACH was then called by the plaintiff, out of order, in pursuance of a previous understanding, to prove the publication of the ordinances, and, being sworn, testified as follows:

I am the city clerk of Los Angeles city. I have a copy of ordinance No. 2636, and have the original ordinance. That ordinance was published in the Los Angeles Evening Express for fourteen consecutive days, beginning on the 11th day of March, 1895, and ending on the 26th day of March, 1895, both dates inclusive.

217 Ordinance No. 1451, already introduced in evidence, and the witness testified that that ordinance was published for ten days in the Los Angeles Evening Express, commencing October 4th, 1892, and ending October 14th, 1892.

Ordinance No. 1717 was published in the Los Angeles Daily Herald one time, one day, the 9th of June, 1893.

Ordinance No. 1436 was published in the Los Angeles Evening Express fourteen consecutive days, commencing on the 12th day of September, 1892, and ending on the 27th day of September, 1892, both dates inclusive.

The Los Angeles Daily Herald and the Los Angeles Evening Express are both daily newspapers published in the city of Los Angeles, and were at the time these publications were made. The ordinances were each approved by the mayor before they were published.

Cross-examination:

Ordinance No. 1436 was published in the Los Angeles Evening Express commenceing on the 12th and ending on the 27th of September, 1892, the time being fourteen consecutive days. The Los Angeles Evening Express is not published on Sundays. The publications which I have testified to with reference to each of these ordinances were all the publications that were ever made of them in any paper in the city.

G. O. NEWMAN was called as a witness on behalf of the defendants, and, being duly sworn, testified as follows:

I reside at Riverside, and have resided in southern California since January, 1875. Am an civil engineer by occupation, and been engaged in that business ever since 1863. Was educated in the Polytechnic Institute of Orebro, in Sweden. Have been

218 engaged in the profession ever since I have resided in California. Came to Riverside in January, 1875, and was engaged with the Riverside Irrigation Company. After that I went down and built

the Orange canal in 1877. And I was in the United States Geological Survey for a year with Clarence King, and from there on the railroad about three years up in Sacramento cañon, and came back to Riverside again in 1855, when I became chief engineer of what is now called the Riverside Water Company and I have been with them ever since. I have been over the land sought to be condemned in this action. Have had tests and experiments made in that land under my observation, concerning the waters that are beneath the surface. There were two trenches cut in the land, one near the lower end of the tract and one near the upper end. The one cut at the lower end is on the south side of the river, or southerly side, and at the upper end on the northerly side of the river. The lower trench will average about eight feet in depth and the upper would average about ten feet. The water is percolating into the trench for about three feet in depth. Several wells were sunk and the water stands in those wells, and the distance below the surface of the ground to the surface of the water depends upon the topography of the country. The water that is developed in the trenches and in the wells is very clear and nice-tasting water. In my opinion, the taking of the 312 acres of land proposed to be taken here is not necessary to preserve the purity of the water developed in the filtration galleries and tunnels run in that land. I mean by saying it is not necessary to take so much land that it is not necessary to have that much to be able to run those different tunnels into the land.

If you want to make a tunnel 16,000 feet in length you will have to have a piece of ground 16,000 feet long to make it, but you don't necessarily have to own the ground to be able to run in that
219 tunnel. The land varies from a quarter of a mile to a half a mile in width, and I can't see any necessity to a quarter of a mile of ground to run in a water tunnel. To run a tunnel 16,000 feet in, you would want a strip of land 16,000 feet in length, but it wouldn't be necessary for it to be 16,000 feet in width. The possession and control of a tract of land of 312 acres isn't necessary to preserve the purity of the water developed by means of the proposed tunnels and filtration galleries that the city intends to construct in this land. I don't consider that the running of stock over the land or the use of the land for the ordinary purposes of husbandry would affect the water a particle, because there are sheep pastured on the land now, and there is no evidence that it has any effect on the water at present. The sheep are pastured over the land where these excavations were made and where the wells were bored, and there is no discernible effect upon the waters by reason of the pasturing of the sheep, or anything that is being done. The channel of the Los Angeles river as it flows through that land runs about east and west, and I should judge it is between three and four feet deep. That is from the top of the bank to the water. On this tract of land we can distinguish three different levels of land, one is the river bed, another what I may term overflow land, and the other the high mesa. There is still a fourth grade; that is mountain. Leaving out of sight the mountains, the general level of this mesa I should judge is between ten and fifteen feet above the flow

of the surface of the stream. I was ther- first in November, 1885, and I was there in February of the present year. I have been looking over this land six days altogether. Was employed by Pomeroy and Hooker. If a tunnel, as proposed by the city, be constructed there, and water developed to any extent, if the channel of the Los Angeles river should change its bed,
I don't think it would affect that tunnel materially, be-
220 cause the tunnel mainly goes under high mesa land where the river never has been, and isn't likely to go over; and if by means of this proposed tunnel and attendant filtration galleries water were developed to any amount, one thousand, or two thousaid, or any other number of thousand of inches, and there should be a change in the course of the river bed, within any limits that it is possible for it to change, I don't think it would have any material effect upon the quantity of water that would flow from these tunnels and filtration galleries. The banks of the river through the tract of land is about three and one-half feet above the surface of the water. The height of the banks varies some, but the least is about three feet, possibly for a short distance it may go down to two feet. I am speaking of the immediate banks of the stream. In some places the height of the banks must be about six feet; that is where the stream comes in close to the high mesa land. The river runs pretty near the base of the mountain. The so-called main supply ditch of the city of Los Angeles taps the Los Angeles river at the upper end of what I call the mesa land on this tract sought to be condemned, and about where that ditch commences the base of the mountain is very near it. Just above that ditch the river really comes right at the foot of the mountain and sweeps the base. The mountain rises above it, I should judge, between seventy-five and a hundred feet in altitude. The hill is on the southern side of the river. On the northern side there is bottom land. I don't remember now just what elevation above the stream. In my opinion, it is practicable to determine the amount of water, approximately, that can be developed there by any proposed system of works. If one is informed of the amount of water that is desired and with the limits of probable development, he can determine what works would be necessary for the purpose of developing that quantity, and after the works were de-
221 termined upon and constructed in a proper manner, in my opinion the ownership of the balance of the tract of 312 acres of land would not be necessary for the purpose of protecting those works. Just at the lower end of this tract of land, the San Fernando valley is narrow, but after that it keeps widening very fast. At the lower end it is between a mile and a half and two miles in width. The tract is pretty uneven, and I should judge about a quarter of what you might term the valley, the comparatively flat land, is covered by this tract. This hill that I speak of that rises to a height of 75 feet above the river is within the tract sought to be condemned.

Q. In your opinion, would it be a practical engineering feat to

develop waters above the tract here sought to be taken, on the river and get out of there without crossing this tract of land?

A. That piece of land really covers the whole river bottom from high bank to high bank, so that it would be rather hard, if not entirely impracticable, to get around that land with any development that we were starting higher up. There is no necessity, in my opinion, for the condemnation of the whole of the lands that are included within these limits, unless in case they want to shut out anybody else from developing water higher up there. That they want to have full control from bluff to bluff. As to the mesa land, it is not necessary at all to take the whole tract for the purpose of constructing and maintaining the tunnel after it is constructed.

Q. What width of land would be amply sufficient both for the construction of the tunnel and the prese-vation of it after it was constructed?

A. Well, I can speak only as a comparison. At Riverside I built a tunnel there 3,300 feet long, and we have a 33-foot right of way for that tunnel, and we found that thoroughly ample. Our
222 tunnel was 52 feet below the ground and this is to be about 40, so that surely 33 feet ought to be ample here, too. It is not more than forty feet at the deepest place below the surface, or about that.

Here the witness is shown the diagram attached to the complaint in the case, and his attention is called to the place marked on the diagram as submerged dam, and he is asked:

Q. What is the necessity for the construction of *of* any submerged dam for the purpose of obtaining the waters in this tunnel proposed to be constructed, and the filtration galleries? What functions will it perform, if any?

A. Well, a submerged dam at that place might have a tendency to force the water up through the bottom of such a channel to some little extent; but if they put in a submerged dam they surely won't need any tunnel, because the submerged dam would raise the water to the surface right at the dam. A submerged dam means that it should go down to the bottom or bed rock.

By the COURT:

Q. Do you mean to say that a submerged dam absolutely means you have to go to bed rock?

A. Well, certainly some call it a submerged dam to drive down piling or something to obstruct the surface water a little. It would be a submerged dam if it was under the ground at all. Still, when I speak of a submerged dam I generally mean it should be a tight submerged dam. It should go down to the bottom of some hard material, and it won't stand very long if it don't. I know something of the depth to which borings have been made in this section.

Cross-examination:

Am chief engineer for the Riverside Water Company. Their system is a gravitation system, taken from the Santa Ana river, Warm

creek, underground drains and artesian wells. We have four
223 different headworks. The main one is in Warm creek, which is a little east of Colton, and consists of a dam across the creek. Have no reservoirs in the system, except a small irrigating reservoir in connection with the domestic supply. We take water from Warm creek entirely for irrigation. We own several strips of land lying along the river up there, which the company has acquired from time to time. The piece right at the headgate is fifty acres. At the middle headworks, I think five acres. At the lower one, I think about eight acres. The company owns lots of land along the river; about 434 acres. In the river, or in the immediate vicinity, that land is for sale. I don't think they would sell just where their gates are. They got the land by purchase from time to time since the beginning of the old Southern California Colony Association. From the underground drains we have obtained about four hundred inches of water, and the under drains are about a half mile in length. There are two of them. First went upon the land sought to be condemned in November, 1895. Examined it and saw what facilities there were to develop water. Went with Mr. North and Mr. Friel. First time just examined the ground. Went up on the 15th of February first to do work upon it, or to examine the work which was already done. I saw the excavations after they were finished. Examined the water in the trenches and wells carefully; tasted it frequently. Didn't have it analyzed. We were up there two days. The water comes from the watershed of the San Fernando valley. The strongest underground flow is at the point where the valley shuts against the bluff there. I don't think any more particularly at the point where the water is diverted into the present main supply ditch, but it is all along that strip of land. The watershed of the San Fernando valley drains towards that bluff and there turns and follows the bluff lengthwise with the river and the Tejunga
224 also. The Tejunga certainly has no underground channel. The waters of the creek sink in the valley and percolate through the whole of the valley. That whole percolation strikes down against that bluff where the land in controversy is lying. Not at any particular point, but all along there. Our development shows that it is just about as strong at the lower end as it is at the upper. In my opinion, a cross-section of the valley just at this point on this land sought to be condemned would show about one-third water.

Q. Having any discernable movement?

A. Well, certainly the water moves. The wells show that it has a grade line. I have not yet determined what velocity it has. Am working on that now.

The COURT: Mr. Dunn, I don't think this is cross-examination.

Mr. DUNN: Well, your honor, if the other side don't object.

The COURT: I am going to impanel the jury immediately after dinner, because you gentlemen can't keep off the other subject to save your lives, either one of you, and we might as well have the jury here and cross-examine to your heart's content and go on as long as you want to.

Mr. DUNN: The counsel asked this witness as to the quality of the water.

The COURT: I know he did, but I don't care anything about the quality of the water in determining this question.

Mr. DUNN: For the purposes of cross-examination we might care particularly, and it seems to me it is cross-examination upon the subject.

The COURT: What I am speaking about is, as to the issues before the court that I am to decide, it don't make any difference whether this water is chemically pure or whether it has some of the few ordinary adulterations *it* it that good drinking water has.

225 By Mr. DUNN:

Q. You speak about levels of the river bed, Mr. Newman. You say you divided it into four levels, I believe; the level of the river bed. What do you call the bed?

A. The ground as lies immediately under the flowing water where the river usually flows. I never saw the river at that point until last November. Don't know where it flowed in 1889, nor from 1884 until now. Wherever it flowed each year would be the river bed at that time. The mesa where the little cabin is there is some soil on top, and after that sand and after that gravel.

Q. When was it put there, in your opinion?

Counsel for the defendants objected to the question upon the ground that there was no foundation laid for it, which objection was overruled and the defendants excepted.

A. I couldn't tell you, but it is surely a good many years ago. It is possible the river might have flowed where the mesa is, some time, but it is not probable. The sand and gravel come from the hills to the south of it. Deposited there by rains that have brought it down from the hill and gradually made that deposit. The river may possibly have flowed there, before the deposit was made. When I spoke of the river bed it is the ground immediately under the flowing water. The surface flow of the river bed doesn't indicate anything certain concerning the underground flow. There may be cases where the river exists in a place that you can reasonably say there is an underflow under that river bed. In this case you see how the streams have changed. There is the Tejunga, has changed for miles, which is because something happened to shut it off at the mouth of the cañon it takes a new channel and shoots miles away across the country. That is not any reasonable thing to show that an underground channel changed its flow wherever the surface stream goes. I know the Tejunga made that sort of change, because I could see it on the map here.

226 It shows the different channels of the Tejunga, how it has run, and I have been on the ground and have seen them on the ground there in November last. We drove up to the Pirtle development, and I crossed dry channels, one after the other, miles apart, where this Tejunga has run. When we dug our tunnels for the Riverside system, we carried the

dirt out through the ends and put it along the ditch, on the thirty-three-foot right of way, but carried it into an arroyo where we had to make a fill. If the city had no place upon which to put the dirt from the various tunnels and filtration galleries, owned no land in the vicinity, there would not be land enough on the thirty-three-foot right of way to deposit all the dirt. But it wouldn't take any 312 acres. I don't see that the stream on this tract of land in various places flowed in three or four streams some distance apart. It is not the fact that the flowing streams at some points on this land is made up of about three or four different little flowing streams as much, in some instances, as one hundred yards apart. I didn't see anything of that kind. It was all one stream through the full length of the land, with well-defined banks at least three feet high Not exactly perpendicular because they couldn't very well stand that way in that kind of material, but as steep as that kind of material could stand. I have driven across in some places. The land sought to be condemned is about a quarter of a mile wide at the lower end. The whole tract of 312 acres covers practically the width of the Los Angeles River valley, from high bluff to high bluff in places.

Q. Or watershed rather?

A. No, not of the watershed. I stated it covered from high bluff to high bluff. The valley north of this land rises pretty fast towards the mountains. The fall of course is towards this land. I stated
227 that the only object the city could have in acquiring this whole land on the south was to keep anybody from getting in there with development from above us. That it would materially interfere with any development being done up above; the city's acquiring the whole land on the south side.

Q. Is it your opinion that our ulterior object in getting the whole land along the south of it is to keep people from getting through there with a right of way from above?

Counsel for the defendants objected to the question on the ground that it was irrelevant and incompetent. The court overruled the objection, and the defendants excepted.

A. Well, I could see no other object than to prevent somebody from getting around there to take the ground up to the top of that hill, because it is surely not to protect the headworks or to develop water. There may be some other object, but I can't see it. You may be acquiring this up to the top of the hill to keep anybody from running a tunnel under there like yours.

Q. Then, in your opinion, all that is necessary for the city to have at this time is about 33 feet in width, in which to build this tunnel, and maybe a little less than that on which to put the filtration galleries marked on the map, is it?

A. Well, you may need at some point a little bit more ground to dump some material on, but as for the right along that filtration gallery or tunnel, what you call it, I can't see that you possibly need any more ground than just to move along. I don't see any object the city can have in view they would need the whole land. You

might want to sink some shafts into that material to hoist out material on and in such a place you might need a little bit more ground for a dumping place, but that is the only thing that I can think of. I am somewhat acquainted with the city of Los Angeles. Have been here often since 1875. I don't know just how many people there were in 1875.

228 Q. Well, there weren't over six or seven thousand?

A. I should not judge so.

If the needs of the people of the city of Los Angeles for water supply should increase at the rate of from fifty or sixty to a hundred inches a year, it might become necessary to build additional filtration galleries, but you wouldn't need to have anything else than a right of way. That, I think, you could get when you came to it. If you wanted to extend your works again, you would have to have more. I don't think that upon driving shafts or galleries there it might develop that one point upon the land was more desirable than another point for the purpose of development. It might be that to some little extent more water could be procured in the galleries at one point than at another, but not very materially, because as your contour map of that shows, for the whole length of that land the percolation sets in against that hill. I don't mean that there is more water in one spot than another; that shows what I mean. I mean it may be clay strata or something that may stop the water and make it come out in one place more than another. It wouldn't be desirable to avoid those clay pockets with the filtration galleries, or that kind of work. If you start in to run a filtration gallery, it won't pay you to go dodging every little clay pocket that you come to. You have to go tolerably straight.

Q. But it would be a very good thing to do a little prospecting and know something about the character of the ground before you run your gallery, wouldn't it?

A. Well, to my mind, I have already prospected enough so I feel certain I know where to run those galleries. It would not make any particular difference to me for I have examined that ground so that I feel certain what can be done. I didn't say a submerged dam wouldn't be necessary if we had a tunnel. I said if

229 you had a submerged dam you would not need the tunnels. I don't know that it would be desirable to have both the tunnels and the submerged dam. If I should go there and put in a submerged dam, I would surely not go to the expense of putting in those galleries, too, because with the submerged dam, if I put it in right I would get all the water. All the water goes through that opening where you propose to put the submerged dam.

Q. The water that comes into this land flows through the land, underground water, and flows out at the point where that submerged dam is indicated?

A. Well, no; I don't mean to say that it runs in any channel. I didn't say so. I say that that water necessarily has got to percolate through the soil between them two mountains to come out through that gap where the Los Angeles river goes through now, at the lower end of that land.

The court here adjourned on March 4th, 1896, and convened again at two o'clock p. m., when the jury was empannelled and sworn, and the jury was then excused until the following morning at ten o'clock.

Mr. NEWMAN then continued on redirect examination:

I don't know what the length of that submerged dam proposed to be constructed is.

L. FRIEL was called as a witness on behalf of the defendants, and, being duly sworn, testified as follows on direct examination:

Have resided in Los Angeles city for thirteen years. Am a civil and hydraulic engineer. Been in the business twenty-three or twenty-four years, and have been making investigations upon ground proposed to be condemned in this action for Messrs. Pomeroy and Hooker. I have made maps of that section, showing the location of the land that is sought to be condemned, with reference to the Los Angeles river, and the various elevations along the
230 course of the strip that is proposed to be taken. I have been deputy county surveyor. The map was here introduced, made by the witness, and entitled, "Plat showing the property of Pomeroy and Hooker, situated in the Providencia, Cahuenga and San Rafael, Los Angeles county, California," and the witness said: It was made in my office under my direction. The land sought to be condemned is included in the line colored red on the north and east, and brown on the south. The exterior boundary represents the Pomeroy and Hooker fourteen-hundred-acre tract, which includes the three hundred and twelve acres sought to be condemned. The parallel blue lines represent the course of the Los Angeles river. The square piece that is on the north, marked Cahuenga tract, represents the tract of land that is inside of the Providencia rancho, and known as the Cahuenga tract, and patented separately from the Providencia rancho. The San Rafael commences at the station of the Rancho Los Feliz and runs in a northwesterly direction. The station is marked on the map, the intersection of the grant line intersecting the red line of the three-hundred-acre tract sought to be condemned. The single blue line represents the Los Angeles city ditch. That is the same ditch which is known as the main supply ditch. The boundary line of the Rancho Los Feliz is directly east of the Pomeroy and Hooker fourteen-hundred-acre tract. The portion of the tract sought to be condemned which lies within the Rancho San Rafael is this triangular piece upon the eastern part of the map. The part that is within the Cahuenga grant is the portion near the southeast corner of the Cahuenga tract. The remainder is in the Providencia rancho. The black hachures represent the hills. The top of the map is north. The elevation of the hills that are marked on the south boundary of the tract sought to be condemned above the surface of the flow of the Los Angeles
231 river is about 350 feet, the highest and different other elevations running down to 150 feet. That is near the western extremity. The river at that point runs at the base of the hills proper. There are about thirty-five acres of block 65 of the Scott

tract which lie within the land sought to be condemned. The red line marked Los Angeles City lateral number 4, indicates the lateral running from the east to the west line, termed the city main tunnel line. This lateral No. 4 is about nine hundred feet in length; the length of the main tunnel about 8,700 feet. On the eastern extremity within the triangle, that is a portion of the San Rafael rancho there are two parallel dotted lines, which represent the submerged dam. The elevation of the mesa on the north above the surface of the Los Angeles river, opposite the submerged dam, is about twenty or twenty-five feet. On the south at the base of the hills it is about 450 feet above sea level, and about six or eight feet above the surface of the river; that is, at the base of the hills. The eastern line of the land proposed to be condemned runs on the south side about thirty feet above the valley land; that is, at the southeast corner. The common corner of the San Rafael and the Los Feliz and Providencia ranchos. Elevation is thirty feet above the valley land. I have been engaged in examining the country there and the proposed works for Pomeroy and Hooker since the first of July, 1895. We have been running some cuts and boring wells. There are two cuts, one near the eastern boundary of the three-hundred-acre tract, and the other is in block 65 of the Providencia tract. The one at the east end is south of the river, and the one on lot 65 is north of the river. The cut on the north side is about 600 feet in length, and will average about nine feet in depth from the surface. I was there while the excavations were being made. We found water at about two or three feet in depth
232 below the surface. The quality of the water developed in these excavations is nice and clear, and very good drinking water; no impurities discernable to the eye or taste in either of them. The wells were put down in each side of the development. They were commenced at seventy-five feet from the cut, and were then seventy-five feet apart, running each way until we would strike the river upon the north and upon the south until we would strike the mesa; and on lot 65 the same way. We found water from one foot to five and six feet below the surface. I didn't examine it as far as the quality is concerned. I have become acquainted with the plans of the headworks which the city proposes to construct, the submerged dam, main tunnel and filtration galleries, by seeing them drawn upon a map which was made in the city engineer's office, and also seeing where the lines were run upon the ground. I don't think it necessary for the purpose of constructing those works and to develop the water, to whatever extent they may develop it, to have the three hundred acres.

By the COURT: It would be desirable, wouldn't it?

A. Yes, I should say it would be desirable to own the three hundred acres. Out of the three hundred acres you would be enabled to develop more water than is laid out by these galleries.

Q. Do you know what depth it is proposed to run this main tunnel?

A. I don't know as I do. I know what the plan that was gotten up two years ago or more called for. It was at an elevation of 450

feet, starting in at the lower end, above sea level, and about thirty-five feet below the surface of the ground at the upper end, and higher than at the lower end. I don't know what is the depth of the tunnel as proposed by the present plan. I don't think there would be any danger of the waters being rendered impure by the ordinary uses of the land for agricultural or stock purposes at that depth. In my judgment it is practicable to determine what
233 work would be necessary to construct in that land to develop a given quantity of water, provided it is within the limits of the capacity at all. If you knew what quantity of water it was desired to develop, and it was within the limits of the capacity of development in that land, it is practicable for engineers to project the works necessary to develop that quantity of water. I don't know what the function of that submerged dam is. The borings that have been made under my supervision are both east and west of this submerged dam, but the borings I made there were only to the surface water. There were wells bored for the purpose of ascertaining where the bed rock was or hard-pan, or whatsoever else underlies that country is. Three were put down at the western portion of the tract, and three toward the eastern portion. The nearest one to the submerged dam is about 1,600 feet. One of the wells was put down to 130 feet. It is towards the northern portion, that is the wide portion of the tract, and one near the headgate of the Los Angeles city ditch and another was put down near station 22 of the Los Feliz rancho, and one was put down in block 65, and the other two were put down near the southeast corner of the Cahuenga tract. The deepest of these wells was sunk to about 200 feet. At that depth we found hard rock. In my opinion, the submerged dam would not be necessary to the development of the waters by means of the main tunnel and those proposed laterals. The main tunnel starts about 1,200 feet east of station 22 on the Rancho Los Feliz and about 500 feet south of the river. There are portions of this tract sought to be condemned where it is about as certain as anything in mundane affairs that the river won't run over by any change in its bed. If the tunnels were constructed and these filtrating galleries, and there were developed by means of them any quantity of water, say one thousand or two thousand inches, and if from some cause that
234 should arise the river should change its channel within the limits of probable changes, I don't believe it would have any effect materially upon the quantity of water flowing in the galleries. From my investigations there, in my opinion, the waters flowing beneath the surface are not supplied by the waters flowing in the natural channel of the river, but both are proceeding from some other source. The water in the land is not from the river. From my examinations for the past few months, I think by the ownership of all the land more water could be developed by putting down parallel galleries or tunnels. I couldn't say just what width of way would be necessary to construct those tunnels. I should say in general large enough to carry the amount of water that I would expect to develop. The Pomeroy and Hooker tract of 1,400 acres, of which the 312 acres which they seek to condemn is a part, is one contigu-

ous tract, and all the remainder of the 1,400 acres lies further up above the tract of 312 acres. In the event of the development of waters upon the portion of the Pomeroy and Hooker tract not taken, the waters so developed could not be gotten away or carried off without going over this land that is sought to be condemned. A portion of that 1,400 acres, other than the 312 acres, is also water-bearing lands. The proportion of water-bearing land is about a mile in length of it. The lands sought to be taken is about 450 feet above the sea level. The greatest elevation of the surface of the ground along the line of the proposed tunnel is nearly five hundred feet in one place. The main tunnel passes under the point of the hill that I have spoken of, and about 75 or 100 feet from the base of the hill.

Cross-examination:

The map referred to was introduced in evidence, and is here
235 referred to and is made a part of this statement. First went to work for Pomeroy and Hooker about the first of December, 1895. I worked for them before; a long while ago, about two years. Ran lines and levels through the tract to obtain information about two years ago, but didn't commence work upon this proposition until about the first of last December. The lines and levels run two years ago were near the line of the proposed tunnel, running from the east to the west. — at line over the surveys as made by the city. They were talking of commencing the construction of a tunnel by Pomeroy and Hooker at that time. Worked there then about ten days. Had a gang of men with me. Ran the north boundary of the Pomeroy and Hooker 1,400-acre tract. Have worked on it fourteen or fifteen days altogether, before I commenced last December, and have been working steadily since December I had charge of the construction of the excavations and the borings. Other engineers were consulted. Mr. Newman was one, Mr. Taylor and I believe Mr. Finkle, I believe were there during the course of construction. Others have gone up since the work was completed. Have talked with them only in a general way. Mr. Standish and Mr. Quinton. Generally towards the lower end of the lower cut we struck water within a foot of the surface or a foot and a half, and everywhere else it ran all the way from one foot up to six. The saturation plane seemed to have a natural slope down the valley, or along the foothills, toward the east, and slopes to the south in the valley. The lowest point of the saturation plane there is a little over four hundred feet, 450 feet at the lower end of the tract. Our object in digging the cut was to develop water to show the amount that could be developed. The upper cut is about 600 feet in length, and we developed about 70 inches. The upper end was at a depth of about eleven feet. The water comes in from the sides and ends. I know it because I could see it.
236 When I say the whole land is not necessary to a certain extent, I mean that it is not necessary to construct that tunnel and the filtration galleries. The whole tract might be desirable to the purpose of developing water. It would be desirable for the city

to have it. As the needs of th- city increase it would become desirable for the development of water. Sometimes after a filtration gallery has been in place for a long time it is apt to draw less water than it did when it was originally put in. And it becomes desirable, in systems of underground conduits, to drive new conduits where an increase of water is necessary for the underground water. If the galleries came close to the surface the water in them might be pollut-d by stock, but in running galleries they would be getting deeper in the ground from your main tunnel, if you were making galleries to develop water. It would not be a benefit to the water to have stock running over the land. It wouldn't be desirable to have a hog pasture over the tunnel and filtration galleries, no matter what depth it was. I wouldn't want it. It wouldn't be desirable to have any stock ranging over the galleries.

By the COURT: What would be the effect of herding cattle over it, locating a stock yard over it?

A. Why, that would certainly pollute the waters.

By the CITY ATTORNEY: Now, you say that the submerged dam shown on that map is not necessary. Do you know what the purpose of that dam is?

A. I may not know what the purpose of that dam is, but a submerged dam at that point for diverting water——

Q. Well, supposing it should be desirable to divert into this conduit the surface water as well as the underground water, run it possibly through an artificial filter or filtering basin;
237 would not this dam become valuable then in that case, whether it went to bed rock or didn't?

A. Certainly it would for the purposes of diversion, but to divert the water of the river you would not heed the submerged dam.

Q. It would be a very proper use to put such a dam to, wouldn't it?

A. Well, I wouldn't advise the construction of it. By raising the dam a little above the surface you could divert to a given point having the proper elevation. It might in many emergencies become valuable. I know the water in this land is not from the river from the investigations that I have been making for the last two months. In general there is a slope of the surface of the water, and the river acts as a gate or channel through that slope and it drains only a little water upon each side of it, and the water stands higher on each side of the river than the water in the river. That is true everywhere that I saw. The water in this land of Pomeroy and Hooker, in my opinion, is working its way down from the San Fernando valley and the mountain ranges above. In general the slope of the land is to the southeast, and the water comes from the north and west of the land, and passes under the river to the base of the mountain. The water flowing on the surface of the river is percolating, coming out of the sides of the bank on each side, and comes from the same source, I should think, that the water does on the south side of the river. The water on the south side of the river evidently comes up raised by an under pre-sure. That is caused simply by the water that is back, it rises and then flows

back or works its way back into the river. There is a pressure behind it somewhere. Then it is percolating down the valley; it comes down and strikes the Cahuenga range of hills and then it must raise and flow east, or turn east, and it strikes the hills and that causes it to raise to the
238 surface. Part of it rises to the surface and part of it flows under along the base of the hills. Works its way along the hills, and comes out through the Pomeroy and Hooker land, and gets into the Los Angeles plains. Down through the open cut between the Cahuenga range of hills and the Verdugo, down the river, of course. The general direction of the movement under the San Fernando plain is a little southeast, until a portion of it strikes the hills and then it moves easterly. In this particular tract I think the contours would show that the water would move in an easterly direction, following the same general direction as the surface flow. The soil which we struck in boring wells on this land is sand, gravel and boulders, and some small clay strata. Some of them are three or four feet probably in thickness. These clay strata are not the same in any two wells. They would not be at the same elevations, and didn't seem to be continuous. We ran through clay pockets in each one of the deep wells. The deeper wells would run from forty feet down to 200 feet. In those wells we occasionally struck this clay strata. The clay strata are not themselves water-bearing. They are impervious to water. Water-bearing land is land out of which water would flow wherever there is a cut made. The water won't move, doesn't move through these clay strata, but there is an obstruction and the water moves around them. For the full development of the water in constructing the filtration galleries, it would be desirable to avoid clay deposits. There may be times when you would want to construct gates, or something that it would be advisable to go through them. To draw the surface water in that land, the loose-jointed or perforated pipe would have to be laid something like five feet of the surface, and it would not drain more than 100 or 125 feet on each side of the gallery.

239 Q. How near to the top would that gallery have to be to drain into it the surface flow, or a portion of it?

A. That would be owing to the material that was in the river. If it was composed of fine silt sand, somewhat cemented, you would get but very little water at a few feet from the surface water flowing in the river as it ordinarily exists. The water of the river brings down the finest silted sand material and does not percolate through that as fast as through the material on either side. The bottom of the river, where it is visible, is sandy and composed of this finer material, being brought down by the water. If you create a void under the river at a depth of five feet, the surface flow, or some portion of it, would find its way down to that void. That is owing to the material between the bed of the river and your gallery. That material there is about the same all over, the same general character. If that material beneath the bed was the same as the land adjoining it, a void created five feet under the bed of the river by means of a pipe perforated or open joints, a portion of the sur-

face flow would find it. If the lateral crosses the river at right angles, there would be a small portion of it; if the gallery ran lengthwise of the river, the most of that water would find the gallery. If the void is large enough you will get all the water that is flowing in the stream. The flow of the river channel has changed towards the eastern portion of the Pomeroy and Hooker tract. But if the river should change by reason of floods or otherwise, and get further from these filtration galleries, I don't think the effect on the amount of water in the galleries would be but very little. If you were taking the river down through into the filtration galleries from its bed, and the bed should change and go off from there, the water would then rise to the general slope of the sheet water, as we might term it, and then the galleries would be collecting from
240 that water. They would develop water other than the water in the river. There might not be just as much. It is reasonable to suppose it would be a little less, but the galleries would then develop this other water.

Q. Where would the other water come from?

A. It is there and would assume the slope that it now has.

While you were taking the water of the river into your galleries, the other water would probably be percolating and going down the valley, and would also increase the amount of the water or by the addition of water to that filtered. Tunnels or galleries at the depth of five feet below the surface would drain about 125 feet on each side of them.

Q. Well, supposing they drained the water out from 100 feet on each side of them, what would immediately occur to fill the voids created by that?

A. The water is continually there; not the same water, but there is other water there to take the place of it. The void created is filled all the time by the pressure from behind and below. They do not affect the flow all the way up to the top of the watershed, because we can demonstrate what the drainage area of any cut would be. It doesn't change the level of the plane of saturation only for a certain distance. It probably accelerates the percolation somewhat beyond the line of saturation. As far as observation is concerned, you can only see that it affects the drainage to a certain extent on each side. To a certain extent I have formed an opinion as to whether the water is flowing all through the San Fernando valley for say a mile above this land, and my opinion is that the water is percolating from the higher to the lower land passing on down, not only through or by this land, but through the main gap lying between the Cahuenga and Verdugo hills, and passing on down through this narrow neck and into the Los Angeles plain.
241 When the water gets into this narrow passageway in the Cahuenga and the Verdugo hills, certainly the movement would be somewhat accelerated; a faster movement than in the lower portion, or of the San Fernando valley proper.

In my opinion, all the water in the San Fernando valley is moving towards the east. I don't think that borings across the valley or a trench across the valley below, or a cross-section of it, at

the west end of this land, would show the water moving in a uniform mass for the whole width. I think in places the water is moving more freely and more rapidly, owing to the material that it is passing through. I have seen the Pirtle development. This comes from the watershed of the San Fernando valley. I don't think that the development has struck a point in the valley where the flow is more concentrated and greater in quantity and rapidity.

I believe that any tunnel or cut run in below the saturated surface of the water in the San Fernando valley will develop water, and somewhat nearly in the same ratio as the Pirtle development, of course, owing to the material it goes through. If it is gravel, it will develop more; if it is fine sand it will be less. A month and a half ago in the Pirtle development they had developed something over five hundred inches, that I measured. I think a cut like that put through at any point in the San Fernando valley in the same material would give a similar development of water, at the same depth below the saturated surface. If it was the same depth and through the same material lower down, I think it would develop more water, or the same. When the water approaches near the land on the south there is an upward pressure that would give more water than the natural percolation or sheet water of the valley would; that is, near the Cahuenga hills. Pirtle's development is about a mile or mile and a quarter from the hills. I think a cut made anywhere between the Pirtle
242 cut and the south hills of a depth similar to his would develop about the same quantity of water. The entire San Fernando basin is a reservoir. One-third, or about one-third of it, after you get to a certain depth, is water. You run a trench below the level of that water, you will develop water owing to the extent of your excavations. If there were different cuts run in several places along that surface in the course of a few years it would lower the plane of saturation, but the rainfall from the mountain shed comes down and restores it. The amount of water in it might be lessened to a certain extent, but what is now the rainfall that comes down, does not stay there, it runs off, as you might say, but with it drained down the rainfall would be collected and would keep the surface of the sheet water about the same. I didn't say that by digging a succession of ditches through and below you can develop water to an unlimited amount. The plane would certainly be lowered with a great amount, or with a considerable amount of excavation, and the result of lowering the plane of saturation would be to reduce the surface water of the Los Angeles river. The plane of saturation of the San Fernando valley might lower five or ten or fifteen feet and yet the water be in the Los Angeles river, on account of the formation. That is simply on account of the Cahuenga range of hills jutting out and which would raise the water to something like the ordinary level anywhere. Lowering the plane of saturation would lower the supply of the surface stream where the water is supplied wholly from surface drainage, but it would affect it very little where there is an upward pressure of water, and the water coming up from below. It would affect it a little, to a small extent.

This evidence in regard to the effect of the surface flow of the Los Angeles river was admitted at this point against the objections of the defendants, upon the ground that it was not probably
243 material to the issue to inquire how much water could be obtained in the lands sought to be condemned.

Redirect examination:

If you were to dig a trench or tunnel or filtration gallery five hundred feet from the river, five feet from the surface and drain 125 feet on each side, from the observations I have made we could not perceive any difference in the water in the river, or at a distance of 125 feet; and as far as we could see it wouldn't diminish the water of the river. The distance of the drainage from the sides of the excavation, no matter what depth it may be, itself indicates the extent of the influence which it has upon the surface of saturation. Water in its movements is governed partly by gravity and resistance. It moves in the direction of the greatest gravity and least resistance, and that it will do all the time. If there is an inclination of the surface of the ground in a given direction, say here from east to west, or northwesterly to southwesterly of a certain grade, say five feet in a hundred, and you excavate a trench running in that same general direction, it will not drain beyond the point where the gravitation is greater toward the trench than it is toward the general movement down. I observed these trenches which we dug on the land in controversy, within the last few weeks to see whether the water comes into the excavations from what direction. We could see that it percolates from the ends and sides and from the bottom. It comes in from the bottom. The removal of the pressure or a part of the pressure from the top of the plane of saturation has a tendency to permit the rise of the waters more readily from underneath. There would be less pressure to overcome.

244 Q. In the case which counsel supposes, of excavations in the bed of the river, or the natural course of the stream and underneath, you say, at a depth of five feet, that it might have an effect of reducing the amount of water in the river. That is, if this filtration gallery were constructed immediately under the surface flow, at a depth of five feet. Was it your opinion that it would have the effect of diminishing the surface flow?

The question was objected to by the counsel for the plaintiff, upon the ground that it was a cross-examination of their own witness, and the court sustained the objection of the plaintiff and the defendants excepted.

Q. I believe you also stated that the amount of the effect it would have on that surface flow would depend largely upon the materials which lie immediately underneath the surface of the river?

A. Yes sir. If filtration galleries were run underneath the surface of the river the percolation of the water into the tunnel or gallery would have a tendency to clarify and filter it. The greater

depth to which it filtered the better the filtering. I would have a filtration gallery somewhat lower than five feet.

Q. But the counsel in cross-examining you asked you what the effect would be if the city should construct a tunnel or filtration gallery underneath the bed of the river at a depth of five feet from the surface of the bed of the river, towards drawing water into it. Now, supposing it did draw the water into it, what effect would the filtration of that water to that extent have towards purifying the water?

A. Well, it would purify it to a certain extent, but I don't know to what extent.

Q. You spoke of the effect of pig pens over this proposed tunnel and galleries; that you thought it might have a tendency to
245 render it impure. Would the question of the number of pigs cut any figure in that calculation?

The COURT: Oh, you can take it for granted it would, Mr. Chapman.

By Mr. CHAPMAN:

Q. And the length of time that they were penned? Or does the court take that for granted also?

The COURT: Certainly.

The WITNESS, continuing: I know where it is proposed to locate these tunnels. For any of the ordinary purposes of agriculture or stock-raising, it is not my opinion that the water would be affected at the depth to which it is proposed to construct this tunnel and filtration galleries. There is no uniformity as to the depth at which the clay strata are found in the different wells. These wells have been bored across this tract of land from the stream west to east, a distance of 8,000 feet. The distance across this pass between the Cahuenga and Verdugo mountains at the easterly end, running in a northeasterly direction, to the Verdugo mountain is about two miles and a half at that point. There is a shorter distance lower down, but not on this tract. The shortest distance lower down across from one range of mountains to the other is about a mile and a quarter, and it is through this pass that the waters of the San Fernando watershed eventually pass. When I said that excavations anywhere in the San Fernando valley of the same kind and to the same depth below the plans of saturation as the Pirtle tunnel, would develop the same amount of water, I had reference to any development towards the lower edge of the San Fernando valley or basin. I did not include all the country up around the San Fernando mission. I said in general that it would be advisable to avoid those clay stratas, for in the development of water you would increase your development of water; and, for the filtration galleries would not filter any water
246 through it, but as far as changing the plans, I have not the information at hand to state just what changes I would make. The clay strata that we encountered are from six inches to four feet, and those that we found four feet in thickness are about sixty feet

below the surface. I don't recollect of finding any at a depth of sixteen feet to any considerable thickness. I know there was some passed through near the surface that were from six inches to a foot in thickness. There might have been some encountered at a depth of thirty-five feet.

So far as our investigations have gone, there doesn't appear to be any clay stratum extending over the country.

Recross-examination:

Am familiar with the main supply ditch, so called. Have measured the water in it. Been measuring water for the last month or month and a half in it quite often. The amount running there the other day was something over nine hundred inches. I measured it about 1,500 feet below the head of the ditch, and then about a thousand feet below that and then say 1,500 feet below that. Measured it down to about the point that it leaves the Pomeroy and Hooker tract. There was a difference in the measurements at these points. I could see the water coming into those excavations with the naked eye. I can't say what proportion comes from the bottom and what from the sides. I could see the appearance, the bubbles coming up continually and the sand working in the cut. There is water in the cut all the time, and I can see it bubbling through that and through the sand in the bottom of the cut. That occurs all along from one end of the excavation to the other. Not continuously, but you can see it from one end to the other.

Q. You can see this bubbling all along everywhere? eh?

247 A. Well, as I say——

The COURT: I think, Mr. Dunn, you will have to stop that examination. You will have to repeat it over again, every bit of it when it comes to the jury, and I don't want to hear it. In fact, more than two-thirds of the examination you are putting these witnesses through will all have to be done over again; and there is very little of it that has now occurred.

The witness continued: By the lower edge of the valley where I say that excavations of a similar kind would develop water practically the same as in the Pirtle development, I include a strip say about a mile wide in the same relative position as the Pirtle development. From the Pirtle development down to the foothills, and from that contour around.

JAMES T. TAYLOR was called as a witness for the defendants, and, being duly sworn, testified as follows:

Live in Pomona, Los Angeles county. Am a civil engineer, been in the business for twelve or thirteen years, from the year 1883 up to the present time have been engaged in that business in southern California. Have had experience as a hydraulic engineer. Have examined the land sought to be condemned. First saw it about the first of February, this year. Went there with Mr. Friel for Messrs. Hooker and Pomeroy, for the purpose of examining the land. Have

been engaged in this investigation about ten days. Know the line of the proposed tunnel and the filtration galleries proposed to be constructed. I don't think that it is necessary for the condemnation of the 312 acres of *of* land for the purpose of constructing that system of works. The lower cut is about 1,500 feet in length and averages I presume eight or nine feet in depth. The other about 600 feet in length, the depth would average about the same, about twelve feet at the upper end. I don't think the water de-
248 veloped in the proposed tunnels or in the filtration galleries would be in danger of being polluted by any ordinary use of the land for agricultural purpose or stock-raising. I should say that it would only be necessary to have a sufficient width to enter upon the land and construct the tunnel and to deposit the material that was excavated, say forty or fifty feet would be ample. To construct the submerged dam would want, I should say, 100 feet in width. If the tunnel and filtration galleries were constructed and water developed any amount, five hundred to a thousand or two thousand inches, if the Los Angeles river should shift its bed within the limits of possible change*d* on that land, I don't think it would have any material effect upon the water in the tunnel and filtration galleries. The water in the tunnel and filtration galleries, whatever might be developed, would not be fed from the surface flow of the Los Angeles river, and where that stream flows would not, in my opinion, have any appreciable effect on the quality. I have had charge of several tunnels for the development of water in southern California, and I think from my investigation of this tract of land it is practicable to determine where to locate the tunnels and filtration galleries for the purpose of developing water in any given amount, within the limits of development in those lands. It is practicable, as an engineering problem, to determine with approximate accuracy the amount or water necessary to supply the needs of a city of 75,000 inhabitants under conditions that exist here. It would, in my opinion, be possible, if waters were developed upon the Pomeroy and Hooker tract above this tract, to take them out and carry them elsewhere, without passing over the 312-acre tract somewhere, but, in my opinion, it would not be practicable, it would be too ex-
249 pensive. On the Pomeroy and Hooker 1,400-acre tract, outside of the 312-acre tract, if you were to develop at the same depth, I don't think you could get out of there at all without pumping and without passing over the 312-acre tract.

Cross-examination:

In some of the developments in which I have been engaged as engineer in charge, they were quite similar to the developments proposed here. The tunnel known as the Alkire tunnel, lately completed, would be similiar in character to a tunnel that would be naturally run in this location. For some distance it goes through the same sort of material. The work consists of a main tunnel and some branches. As I understand, your filtration gallery is simply what is known as a tunnel, branches which collect the water. The tunnel of which I speak is about 6,000 feet long; branches only

about thirty or forty feet in length. The company owns about 13 acres of land; for the rest they only have a right of way. Am acquainted with the city of Los Angeles to some extent. Am acquainted with the proposed works. I believe the main tunnel below the surface of the ground at the upper end is about 32 or 33 feet. The filtration galleries branch out from that at different points. In order to drain the water off from the land they will have to be on an incline, have to have some grade. If I remember rightly the grade of the tunnel is a foot in a thousand. There are four filtration galleries proposed. I don't know the size of them. The amount of water they will carry will depend upon the grade. Have had other experience in development of water in other places. I have a general idea of the main tunnel and filtration galleries proposed to be constructed, as to what length they would go, with reference to the surface flow of the river. Some of the laterals run under the river. The two upper ones.

Lateral number one as indicated upon the map seems
250 to run to the river and to the north line of the tract.

Lateral number two does not run under the bed of the surface flow, but runs parallel with it and close to it some distance. Lateral number four runs directly under and across it. If the laterals were laid at a depth of from three to eight feet from the surface, at the points where they cross the river, or run parallel with it, and built with open joints or perforated the surface flow might be affected by it. You could locate the galleries to make a direct connection with the river, and take the whole flow. Where the excavations have been made it shows that the top soil is some loam and fine sand, that increases to coarser sand and gravel mixed with it. The soil where the river flows is something of the same character. Presuming the material to be sand and gravel, if a filtration gallery of sufficient capacity to carry the surface waters of the river were run under and parallel with the river, I don't think, if it was laid eight or ten feet, it would have any apparent effect upon the flow of the river. If laid within three feet, with open joints, perforated pipe, it would carry off some of the surface flow. I think laid at a depth of eight or ten feet it would not carry off the surface flow. If within three or four feet it might carry off a considerable amount of the water. I think it would. I don't think that with the material that it is composed of, that pipes laid three or four feet under the ground would take all the surface flow because the resistance is much more running through sand and gravel than running off in the open channel, and I don't think the entire volume would run through. As much water as went from the surface into the pipes when running from them, would be lost to the pipes, if the river bed changed approximately. A tunnel constructed thirty feet beneath the surface would drain on each side of it, I should say

four or five hundred feet. It would reduce the elevation of
251 the saturated plane as far out as there was any effect. It would not affect it as far as the saturated plane existed necessarily. The whole saturation plane of that valley would not be affected by a draft at one point for four or five hundred feet back

Q. If that is the case then, the saturation plane would not be affected by ten tunnels similar to this, would it, placed at different points in the valley?

A. That would depend on the material underneath the surface. Some of it much more compact than others. On permeable soil it would affect it further than it would in soil that was impermeable to water.

By the CITY ATTORNEY: When a void exists in the saturation plane, similar to that, by reason of a draft of water from the plane, that void must be filled, must it not, from somewhere?

A. Yes sir.

Q. Where will that void be filled from?

A. Well, the water that is underneath the surface is slowly percolating on the hydraulic grade line; and the watershed above is continually keeping up that supply. So that if the water is drawn off at one place, it affects it to a certain distance, as far as we can observe. When the void is filled it must make a draft of back water somewhere of sufficient amount to fill the void, but that will not lower the saturation plane. It would do so if there wasn't any other water coming in to fill that. The water in this valley comes from the rainfall on the watershed. An artificial draft on that supply of water might reduce the level of the plane; it can't be observed.

The COURT: The laws of nature, Mr. Dunn, are matters that the court must take judicial notice of.

The witness continuing: It is a fact that the water taken by the draft from the saturated plane by artificial drafts will reduce
252 the level of the saturated plane to a distance of four or five hundred feet.

Q. If you reduce the saturated plane which supports the surface of the Los Angeles river, what would be the effect upon the surface flow?

A. That depends altogether upon whether the river is filled by that flow or not.

Redirect examination:

I have been along the course of the stream through this tract of land in several places, probably four, and observed the bed of the river at each place for a distance of probably a hundred feet or more. The material that lies under the surface of the bed of the river at the places where I observed it were sand and a little gravel, mostly sand. In some places I noticed there appeared to be more gravel than at other places. Those so-called laterals, if they were constructed for the purpose of draining the surface flow of the river, could be made practically to drain it, but if the laterals are constructed with the view of intercepting the underground flow, I don't think there is any necessity of extending them under the river bed, and if they were extended under the bed as feeders of the underground flow of the main tunnel, I don't think they would have any effect upon the surface flow, unless they were laid very close to the bed of the river,

if properly laid. I don't see any necessity for laying them very close to the bed of the river for that purpose. I think the depth of the main tunnel at the point of connection with lateral number four would be in the neighborhood of thirty feet. From the point of connection of the lateral with the main tunnel to the point under the bed of the river where the lateral passes it is about three hundred feet. The development in the cuts seems to show that the water is seeping in very uniformly over the surface that is exposed, with
253 the exception of say two feet from the surface of the ground down in the cut. I stated in cross-examination that if these laterals were laid underneath the bed of the river sufficiently near to the top to affect the flow in the river, and the river changed its bed, leaving the laterals, it would affect the quantity of the flow in the laterals by just so much as percolated from the river. I noticed along the bed of the river as to whether the water came into the river from the bottom, pressing upwards, as well as from the sides. In some places there seemed to be water coming up along the edges of the channel. It would reduce the amount of water that would come up by the upward pressure, if the river channel should flow off somewhere else.

Recross-examination:

Where the laterals cross the river bed at a depth of 30 feet, I don't think any portion of the waters of the river would find their way into the tunnel, or the galleries connected immediately with it at that point. The natural drainage would be four or five hundred feet, but whether these waters would come in at three hundred feet or two hundred feet, or any other distance nearer than about two or three or five feet depends on where the location is. I mean by upward pressure, that it is a pressure due to the water flowing in the valley below that forces it up.

By the COURT:

Q. It is a pressure due to an obstruction in the stream, isn't it?

A. The dyke that is formed by the Cahuenga hills there forces the water to the surface; that causes an upward pressure. The water plane is not a level plane. From the time it percolates into the ground at the base of the hills, at the northeast and west of the basin of the San Fernando valley, it assumes a hydraul-c grade
254 line, and flows down in that direction and percolates on down through the soil until it meets some obstruction which, in this case, is the Cahuenga hills, and there the water is forced to the surface. The saturated plane assumes a lower grade as the direction is changed from the west to the east. It takes a lower or flatter grade.

It was here stipulated that the ordinance of the council, providing for the issue of $30,000 of bonds, and the proceedings thereon, had been examined by counsel and that the ordinance of intention, which had been introduced, and the ordinance calling the election, with the proof of publication, might be introduced, and then coun-

sel would agree on a general statement that under that bonds were issued and sold.

It was subsequently admitted that proceedings were duly had after the commencement of this action, whereby bonds of the plaintiff were duly issued and sold in the amount of $30,000 for the acquirement by the city of the lands sought to be condemned here, whereon to construct headworks for the diversion of water, which sum of $30,000 was then in the treasury ready to be used in payment for said lands.

F. C. FINKLE was called on behalf of the defendants, and, being duly sworn, testified as follows:

I reside in the city of San Bernardino. Am a civil engineer. Been in the practice of that business about nine years. Made a study of hydraulic engineering and been practicing that branch of the profession for the last nine years. In southern California principally. Have been on the tract of land sought to be condemned here, in the employ of Messrs. Pomeroy and Hooker, with a view to making an investigation of the matters involved in this action. Went up there first and visited the land on the 15th of February, 1896. Have been engaged in that investigation there nearly all the time since, with the exception of a few days. Have
255 been over all the tract, except some of the higher mountain sides. Have seen the Los Angeles river as it flows there in its natural course. Have seen the channel of that stream through about all of this tract of land. Knowing the amount of water needed for the city of Los Angeles, either at this time or for any future growth, having examined the land in controversy and tested it thoroughly, having satisfied myself that it contained a quantity of water sufficient for those needs, there would be no difficulty as an engineering proposition to determine the character of the works and place of locating them for the purpose of obtaining that supply. Having considered all the conditions to be met, as well as the conditions of the land from which the supply is drawn, as engineer, I think, could very easily determine what would be necessary to accomplish the end in view. I think it would be both proper and reasonable and prudent that an engineer employed by a municipal corporation, with the view of the establishment of such a system, should make a thorough investigation. The first thing would be not only what the city would need, but also what could be obtained from the land under consideration, and, having made such an investigation, it is feasible to determine in *in* advance where to locate tunnels, filtrating galleries, settling reservoirs and basins, and collecting chambers for the purpose of obtaining that quantity of water. If the tunnel and filtrating galleries had been constructed in a proper manner for the purpose of collecting the water, and had collected it, it would depend somewhat upon the kinds of tunnels and galleries that were constructed, as to whether the amount would be affected by a change in the flow of the Los Angeles river to some other place within the range of possible changes on this land. If the tunnel and galleries were constructed with the view to

draw from the river, of course that would be done and the
256 change of the river might have an effect upon the amount drained from it. If you were constructing filtrating galleries or tunnels with the view to drain from the river, the proper manner would be to construct it under the river and not very much below the river, only enough to be safe from the scouring effect from the outside, and in the material that exists there I don't think that would be very deep. I think a tunnel would be safe at five or six feet below the present bed of the river. It would be a difficult matter to construct any tunnel under that river that would draw all the water from it. If I wanted to draw the water off and didn't want to do like any ordinary person that wasn't a hydraulic engineer, my process would be to construct what is known as filtration basins in that river. They are constructed by making excavations under the bed, chambers, and cover them with porous material on top with sufficient porosity and character to allow the river water to pass through into the basin, from whence it could be diverted into the basin, from whence it could be diverted into a pipe or canal, which would filter it through these basins and not through the natural material of the earth. If that were done and the river should shift its channel, it would have a material effect upon the quantity of water that would flow there. But if such systems are constructed and the river should change its channel, there would be two ways of getting at the water; one would be to turn the river back to its former course, or you could extend or construct new filtration basins which would be the more easily done and cheaper, would depend upon the case in hand, to some extent. In most cases the cheaper plan would be to turn the river back over the filtration basins. Taking that locality and the range of probability of change in the channel, I should say that the cheaper and the quicker method of remedying a change of the
257 channel, would be to turn the river back. A condemnation of a line through there upon which the river runs and the right to maintain it in its course, would, so far as that scheme of which I am speaking is concerned, meet all the necessities for the purpose of draining the surface flow of the water of the river. I know approximately the alignment of the tunnel proposed to be constructed by the city and the general plan, so far as laying it out on the premises are concerned. As to the details I have never heard anything about them. If the tunnel were constructed at a depth of ten or fifteen feet below the surface and the material above were undisturbed by the construction of the drains underneath, from the character of the material there, I don't think that any water from the river would filter down into the tunnel. That is, nothing worth mentioning. Nothing more than would filter away by evaporation and the consumption of plant life, even if there were no tunnel there. I have seen the excavations made upon the land by Pomeroy and Hooker and have observed the water in the excavations. Know the quality of it by tasting and seeing it and judging from the appearance and taste of it I would say that it is excellent water. These excavations are from three up to nine feet in depth about. I noticed how the water came into the excavations. Looked into

the bottom of them. I saw that there was water coming from underneath, as well as from the sides. The water from one of the cuts empties into the river, so that it must be somewhat above the river at that point. If the tunnels and filtration galleries proposed to be constructed should be a depth of seven or five, or ten or fifteen feet below the surface, I should say that the purity of the water would not be affected by any ordinary uses of the land for agricultural or horticultural purposes, stock-raising or anything of that kind. In the cuts that are
258 made there is nothing visible, either in the appearance or taste of the water that indicates that it is in any manner impure or polluted by causes of that kind or any other. I should say that the plan of construction of the galleries and feeders, if the pipes were to collect the waters that were percolating in the soil, should be entirely different from what they should be if you were constructing them with the view to drain the surface water from the river. In case of development of percolating waters, you would have to penetrate the earth deeply. In the case of simply to divert the water from the river by filtration into tunnels, you wouldn't have to pen-trate only a shallow depth below the safety line, a line that would be safe from erosions from the channel. For the purpose of developing the water I should say the deeper you constructed the tunnels the better, so that you didn't get below the water-bearing strata. I know approximately the elevation of that tract of land above the city of Los Angeles. You can get up to about four hundred feet above sea level and still go thirty feet deep beneath the surface. At that depth there wouldn't be, in my opinion, any danger whatever of polluting the water that would be developed by any ordinary uses and purposes to which the land could be subjected in the course of agriculture, horticulture, and stock-raising. If your plan was to draw the surface water into the filtration tunnels, the danger of pollution would be along the channel of the stream itself, and to protect the water against pollutions of that kind you would have to practically control the stream from the filtration basins up to its head, that is, up to where the water makes its appearance. The mere possession and control of this particular tract of 312 acres of land wouldn't furnish any protection worthy of consideration against the pollution of the surface stream itself; I mean an absolute protection. I have seen a plat which shows the ap-
259 proximate location of the tunnels and filtration galleries. The filteration galleries extend to a point on the land about 500 feet from where the Los Angeles river first enters the tract of land sought to be condemned, that is, from the end of the tunnel. Lateral number 4 is about 1,500 feet from the upper end of the tract. From where lateral number 4 crosses the Los Angeles river and the main tunnel intersects the Los Angeles river, it is about 7,000 feet to where the Los Angeles river leaves this tract of land on its eastern extremity. So far as the water that is taken from the surface flow of the Los Angeles river into this main tunnel and filteration gallery at that point is concerned, the possession of the entire tract below there wouldn't have any tendency to protect the water

of the river from pollution at a point below where the tunnel and filteration gallery crosses it. The only protection that would be afforded to the waters taken at that point by the ownership of this land would accrue on the five or six hundred feet of land that lies to the westward. From that point down to 24 or 25 hundred feet to where the main tunnel again strikes the Los Angeles river. Where the main tunnel crosses the river bed near the west boundary of the tract, it is approximately 35 feet below the surface. Knowing the conditions existing in the city of Los Angeles, or any other city, and given the population actually existing, or which one contemplates in the near future, as an engineering proposition, there is no difficulty in determining the quantity of water which would be necessary to supply that city and its inhabitants.

By the COURT: Is it your contention, Mr. Chapman, that the city cannot condemn property except such as it may need in the near future?

Mr. CHAPMAN: Yes, sir, that is one proposition, and an-
260 other is, in the amended complaint they state what they claim to be the necessities for taking this tract of land.

The COURT: It has been my theory that the city has a right to condemn property for such use as a far-sighted man would consider it might need for any period, instead of the near future. I am quite sure that is the correct theory, also.

Mr. CHAPMAN: We would draw a distinction between a condemnation for the purpose of use and a condemnation for the purpose of speculation.

The WITNESS, continuing: I have paid attention to the levels of the different portions of this tract of land. I am acquainted with the boundaries of the 1,400-acre tract, called the Pomeroy and Hooker tract, of which this 312-acre tract is a part. The mountains that are included within the 312-acre tract are on the southerly margin of it, and I should say approximately some of them might rise as high as 300 feet. Some are lower. The lands on the Pomeroy and Hooker tract southwesterly up the river are water-bearing lands. In my opinion, if water were developed on any portion of the water-bearing lands still owned by Pomeroy and Hooker and not included in this condemnation suit, it would not be possible to take the water out by gravity on the south side of the river, without crossing the land sought to be condemned, except by means of tunneling through the mountains. You could not get out on the surface without crossing the tract sought to be condemned. The tunnel I speak of would be through the Cahuenga mountains. The cost of tunneling through there would, in my judgment, bar the possibility of it practically. As an engineering proposition it would be possible to do it. You could not make developments on the land not sought to be condemned and get out of it to the city of Los Angeles to where the water could be sold and disposed of on the north side of the river, without crossing this tract of
261 land that is sought to be condemned, not as a practical and paying engineering proposition. I can't think of any pur-

pose that would require the condemnation of the whole 312-acre tract except to control the outlet of the waters above to the sections of the country where it is needed, the city of Los Angeles, the Cahuenga foot-hills and the slopes out to the east where the water would run by gravity.

In answer to questions asked by the court, the witness testified that if you wanted to control practically all the water from that watershed, both percolating and surface water, that tract of land is a good tract of land to have for that purpose, so far as the capacity of the watershed is concerned. In distinguishing between the control and development of all the waters of that watershed, I mean by controlling it, that you could practically control it by preventing anybody from getting out with it, but you couldn't get it all yourself.

Cross-examination:

It is my opinion that this land is practically the key to the situation, with reference to controlling the watershed. It controls the watershed to a large extent. There is some water percolating northeast of this tract. I haven't made a sufficient examination yet to tell exactly what proportion of the watershed it controls, but I think a fair estimate is that the consequence of obtaining this tract of land, taking the effects on the upper portions of water-bearing lands above, would probably be to control at least three-fourths of the watershed. It might control slightly more. The discharge from that watershed in the ordinary seasons, including the surface flow of the Los Angeles river and also the subterranean percolation, I think will amount to over 20,000 inches, measured under a four-inch pressure, during the summer. The rainfall in the
262 San Fernando valley as far as the statistics I am able to obtain show about seventeen inches of annual rainfall. That, however, is not the rainfall of the watershed, because that is only the low portion of the valley. While the mountains have a much greater rainfall, but there is no observed data, as far as I know, on those mountains. The area of the watershed above this tract of land sought to be condemned is approximately 485 square miles.

Q. How much do you allow for run-off outside of the water which runs on the surface of the Los Angeles river, including storm water and plant life and used in wells?

The COURT: What is the purpose of this cross-examination? I don't see the point you are leading to.

And the city attorney here withdrew the question, and witness continuing, in answer to other questions, testified: To make a guess at the number of inhabitants of the city of Los Angeles now, I should say there are probably seventy thousand. I don't know how many there were in 1870. I don't know the existing conditions of this city as to population or growth, only in a very general way. I don't claim to be posted on this city. I am thirty-one years old next May, and an engineer at this time for a good many water companies. Am chief engineer for the East Side irrigation district. They have a water system from artesian wells and pumping and

some under drains. The deepest well is 700 feet deep. We only have one drain about 7 or 8 feet in depth, and 1,200 feet long. Have six wells. The 1,200-foot drain runs through land which contains percolating water. It is a flume without a bottom and with perforated sides. The company have a contract to buy the land upon which they get their supply. They contracted to buy sixty acres. We have a pumping plant also. They develop sufficient for about a continuous flow of between eight and ten cubic
263 feet per second, which in inches under a four-inch pressure, would be four to five hundred miners' inches. That includes the gravity and pumping plant.

Witness testifies with reference to other development schemes with which he has been connected. I went up above the land sought to be condemned to where the Cahuenaga pass comes down. I didn't notice the cienegas or lagoons on the left-hand side of the road that comes down out of the pass. Don't know the elevation of the land north of this sought to be condemned, except in a general way, nor with reference to the elevation of the land west of them, except in a general way. My idea is that the land rises toward the north and San Fernando valley rises toward the north and west, and the contour would run diagonally across the valley. Water might be developed on the lands west of the lands sought to be condemned, that could be carried through a ditch along the north side of the land; if you make the development right on the surface you would carry some of it out. I have not examined the land to see how much could be developed in any way, but I know in order to develop it it must be developed down deep. I am not very familiar with the wet lands adjoining the river to the west of the lands sought to be condemned, and for three-fourths of a mile up. I could not tell, without consulting notes on the subject, whether water could be developed on those lands in the western portion of the Pomeroy and Hooker tract and carried out along the north line of this tract. I am of the opinion that a small quantity could be, but it would be so small that it wouldn't pay to carry it out. My opinion is based on walking over the land and looking at the contour map also. I examined the contour map with reference to the water and elevations. I didn't summarize the results. I simply say that the water that could be developed without getting below the elevations of this
264 land sought to be condemned would be so small it certainly wouldn't pay to take it out. And that that pipe or tunnel could be submerged on the west and water could be carried off to the north of the lands sought to be condemned. If it were submerged just deep enough and not too deep.

Q. Did you ever see the plans of this main tunnel?

A. What do you mean by the plans? This map that is shown here, showing the location of the tunnel?

Q. Yes sir.

A. I have seen that, yes sir. I don't know exactly how deep the tunnel is to be laid. I know nothing about it, only what I remember of looking at the profile. I think the profile showed the depth, but am not sure. I don't think I saw the profiles of the filtration

galleries. I don't know how deep they are to be laid. Suppose the tunnel were laid at the depth of thirty feet, and the filtration galleries leading from it, and they were properly constructed, or constructed as I would construct them, I think I could get them to carry off in the vicinity of three thousand inches of water, without taking any from the surface flow. I should not lay them exactly in the places that these are, and I don't think I would lay just the same number. I don't think, in order to carry off three thousand inches, it would be necessary to lay any more tunnels. There might be a slight difference in length. I might change them and put them in a different location. I don't exactly know whether I would lay more or less yet, it is a question of detail that I would not want to answer without figuring on it. A tunnel at a depth of thirty feet, laid as I would lay it, would lower the water level at the top of the ground approximately about 720 feet each side of it. If that filtration gallery ran along parallel with the river, whether it would affect the surface flow or not would depend on how you built
265 it. If you didn't want to drain the river you would have to protect the filtration galleries where you cross the river. You would have to make close joints in the pipes within the proper limits of where you cross the river. If the tunnel was laid ten feet deep the pipes should be close joints about 100 or 150 feet, somewhere along here.

Q. Suppose that water to be ten feet at the nearest point from the surface, and twenty feet at the deepest point from the surface where it crosses the river.

Mr. CHAPMAN: We object to the question as irrelevant and immaterial. I have been waiting for an hour to see when it was going to get to the question of necessity, and I don't see anything of it yet.

The COURT: I will sustain the objection.

Witness, in answer to other questions, said: If I were to put this drain in, with my own notion, and take off three thousand inches of water by *by* means of these submerged or underground conduits, it would only lower the saturated plane of this watershed at a very short distance from the land just adjacent to the drains, approximately not to exceed seven hundred to a thousand feet each way from the drain, if the drain were thirty feet deep, as I have been intending to put them in. I have seen the Pirtle developments and measured the water from it once. I examined the land around the Pirtle development; the effect on the saturated plane depends a great deal on the character of the formation. I have made experiments down below to determine that effect, to see how the present cuts affected the saturated plane. In the lower cut upon the land sought to be condemned, there is about 120 inches of water, and in the upper one about seventy-five. The cuts on the Pomeroy and Hooker property.

The patent of the Los Feliz rancho was here put in evi-
266 dence, of which, so far as important to any question here, and omitting the description, the following is a copy:

*Los Felis.*

The United States to all to whom these presents shall come, Greeting:

Whereas, it appears from a duly authenticated transcript, filed in the General Land Office, that pursuant to the provisions of the act of Congress, approved the third day of March, one thousand eight hundred and fifty-one, entitled "An act to ascertain and settle the private land claims in the State of California," Maria Ygnacia Berdugo, as claimant, filed her petition on the 26th day of October, 1852, with the commissioners to ascertain and settle the private land claims in the State of California, sitting as a board in the city of Los Angeles, in which petition she claimed the confirmation of her title to a tract of land known by the name of "Los Felis," situated in the county of Los Angeles, and State aforesaid, said claim being founded on a Mexican grant to the petitioner, made on the 22nd day of March, 1843, by Manuel Micheltorena, then governor of both Californias.

And whereas, the board of land commissioners aforesaid on the 28th day of February, 1854, rendered a decree of confirmation in favor of the claimant, which decree or decision having been taken by appeal to the district court of the United States for the southern district of California, the said district court at its December term, 1856, in the cause entitled,

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| MARIA YGNACIO BERDUGO, Appellee, *ads.* THE UNITED STATES, Appellants. | } | No. 133. "Los Felis." |

267 Ordered, adjudged and decreed that the decision of the said commissioners, be, and the same is hereby affirmed, and that the title of the said appellee, Maria Ygnacio Berdugo, to the lands claimed by her in this case, be decreed to be good and valid.

The lands of which confirmation is hereby made, are situated in the county of Los Angeles, and are known by the name of Los Felis, being the same lands granted to the said Maria Ygnacio Berdugo by Manuel Micheltorena, governor of California, on the 22nd day of March, A. D., 1843, and are bounded and described as follows:

On the north by the lands of Julio Berdugo, on the south by the river of the pueblo (city) of Los Angeles; on the east by the rancho of the citizen Juan Moret.); on the west by the mountains, reference for a more particular description of the said lands being had to the said grant, and the record of the juridicial possession on file in this case, the same being confirmed to the extent of one and one-half square league and no more.

And the Attorney General of the United States having given notice that appeal would not be prosecuted to the Supreme Court of the United States, the aforesaid district court at its December term, 1857, ordered "that said appeal be and the same is hereby dismissed and that appellee have leave to proceed under the decree

heretofore made in her favor as under a final decree," whereby the proceedings of court on title became final.

And whereas, under the 13th section of said act of 3rd of March, 1851, and the supplemental legislation, and in accordance with the proceedings had pursuant to said act and supplemental legislation, there has been deposited in the General Land Office a return with a plat of the survey of the said claim, confirmed as aforesaid, authenticated by the signature of the United States surveyor general of the State of California, whereby it appears that said claim has
268 been designated as lot numbered thirty-eight, in township one north of range thirteen west; lot thirty-eight in township one north of range fourteen west; lot numbered thirty-eight in township one south of range thirteen west; and lot numbered thirty-seven in township one south of range fourteen west of the San Bernardino meridian, containing six thousand and six hundred and forty-seven acres and forty-six-hundredths of an acre, situated in the State of California, the plat and the aforesaid return of survey being in the words and figures as follows, to wit:

(Here follows plat and description of land as same is shown on the several maps introduced by defendants and shows the tract between lands in suit and the pueblo lands of plaintiff.)

Now know ye, that the United States of America, in consideration of the premises, and pursuant to the provisions of an act of Congress aforesaid of 3rd of March, 1851, and legislation supplemental thereto, have given and granted, and by these presents do give and grant unto the said Maria Ygnacio Berdugo, and to her heirs, the tract of land embraced and described in the foregoing survey, but with the stipulation that in virtue of the 15th section of said act, the confirmation of this said claim and this patent, "shall not affect the interests of third persons."

To have and to hold the said tract with the appurtenances unto the said Maria Ygnacio Berdugo, and to her heirs and assigns, forever, with the stipulation aforesaid.

In testimony whereof, I, Ulysses S. Grant, President of the United States, have caused these letters to be made patent, and the seal of the General Land Office to be hereunto affixed.

Given under my hand at the city of Washington, this 18th day of April, in the year of our Lord, one thousand eight hundred
269 and seventy-one, and of the Independence of the United States, the ninety-fifth.

By the President:

U. S. GRANT,

[L. S.] By J. PARRISH, *Secretary.*

I. N. GRANGER,
*Recorder of the General Land Office.*

Recorded vol. 7, pages 414 to 417 inclusive. A full, true and correct copy of the original recorded September 22, A. D., 1871, at 1.30 p. m. at request of J. G. Downey.

THOMAS D. MOTT,
*County Recorder,*
By J. W. GILLETTE, *Deputy.*

At this point the evidence upon the questions submitted to the court was then concluded, and the trial began before the jury upon the questions to be submitted to them. The pleadings were here read to the jury, and then a recess was taken until two o'clock p. m., and at said hour of 2 p. m., on Friday, March 6th, 1896, the trial before the jury began, and the following proceedings, so far as relates to the exceptions presented by this bill of exceptions, were had.

The court having ruled that the burden of proof was upon the defendants to establish the amount of compensation to be paid, or damages awarded, the defendants called as a witness A. K. NUDSON, who, being duly sworn, testified as follows:

Am a well-borer by occupation. Have been engaged in the business of boring wells along the river in the Pomeroy and Hooker tract on the tract sought to be condemned, about two months. Have bored six wells, and kept a record of the various strata through which I passed.

Well number one was bored on the south side of the river, ten-inch well. Got water at five feet from the surface. It was soil or sand down to that. From five to thirteen feet, fine sand, thirteen to
270 twenty-one feet, sand and some few boulders mixed; 21 feet to 21 feet six inches, clay, no water in the clay. Was water between the 13 and 21 feet. From 21 feet six inches to 29 feet, gravel with water; 29 feet to 30 feet, clay, no water; 30 feet to 62 feet 6 inches, boulders and gravel, good water; 62 feet six inches to 63 feet, clay. The water from the 62 feet six inches raised about six inches in the pipe above the starting point, above where I first struck it. That is when I struck that strata of water the water raised six inches higher in the pipe than it was before. From 63 feet to 65 feet, gravel. There I had a raise of water. From 65 feet to 69 feet, clay and cement, with boulders, no water in it. From 69 to 79 feet, gravel with water in considerable quantities; 79 to 89 feet, boulders and gravel, very coarse material, bearing good water. From 89 to 115 feet, gravel and boulders with water; 115 feet to 119 feet clay, no water. From 119 feet to 123 feet, sand with water, but not very much. From 123 feet to 127 feet, clay and gravel mixed, no water; 127 to 145 feet, cement and gravel, no water; 145 to 165 feet, clay, no water; 165 feet to 176 feet, sand, apparently dry; 176 to 193 feet broken-up granite, decomposed, no water; 193 feet to 205 feet, hard rock, no water in it that I could discover. That was the end of the well.

The bottom of the strata bearing water was apparently at 123 feet. The surface of the ground at the point where that well was bored was at an elevation between eight and ten feet above the surface of the river, as near as I could judge. The point where that well was bored was from a half to three-quarters of a mile above where the ditch of the city takes the water from the river, and to the west up the river, and on the same side. That well is right at the head of the middle cut. When the water raised in the pipe, as I have

stated, it did not subside immediately, but stayed there all
271 the time and didn't lower until we punctured the pipe, or drilled a hole in it at the bottom of the ditch to let the water out.

Well number two is on the north side of the river about a quarter of a mile from well No. 1 in a northwesterly direction. In that well at four feet from the surface struck first water. Not very strong when I first struck it. From four feet to 31 feet, sand, bearing some water; 31 to 59 feet, boulders and gravel, bearing water in considerable quantities; good water.

By the COURT: Do you mean good quality of water, or a great deal of it?

A. Yes, a great deal of it.

From 59 to 62 feet and a half, clay, with no water. At every place where I struck the clay there was no water. From 62 and a half feet to 65 feet, sand and gravel with water. There I had a rise of water of about eleven inches in the pipe. From 65 to 101 feet boulders and gravel; abundance of water; 101 to 106 feet cement boulders and gravel mixed, dry; 106 feet to 110 feet, clay. That is the end of that water. The depth of that well was 131 feet, and there was apparently no water below 101 feet that I could discover. That well was situated to the northeast of the upper cut and about a quarter of a mile from it, as near as I could judge. It is about 200 feet from the channel of the Los Angeles river.

Well number three I sank at the head of the upper cut. On Pomeroy and Hooker land. I mean the excavation. In that well. At 5 feet six inches from the top of the ground I got water. Went through sand 5 feet six inches to 15 feet; fine sand bearing water; 15 feet to 15 feet six inches clay; 15 feet six inches to 19 feet, sand; water-bearing; 19 feet to 20 feet six inches, clay; 20 feet six inches to 33 feet, gravel with water; 33 feet to 35, clay; 35
272 feet to 49, gravel and boulders mixed; abundance of water. This is a seven-inch well. That was the depth of that well.

The next well was sunk on the south side of the river, between a half and three-quarters of a mile below the first well, as near as I can guess it. About two hundred feet from the Los Angeles city ditch. It is below the head of the ditch and near the cabin. From the surface down to 23 feet in this well found dry sand and soil; 23 feet to 25 feet, clay, and just as I broke through the clay at 25 feet I struck the water in sand and gravel mixed; from 25 to 41 feet, gravel and sand mixed, bearing good water. Forty-one feet is the depth of that well.

The elevation of the surface of the ground there above the surface of the river was about fifteen or eighteen feet. The level there is higher than where I sunk the first well above the surface of the river.

The fifth well is lower down on the south side about 200 yards, lower down than the first well, and is on the mesa. From the top down to 18 feet, dry sand; 18 feet to 21 feet, clay. At 21 feet I struck the water, and from 21 feet to 29 feet I had gravel bearing water. That was the depth to which I sunk that well.

The sixth well was lower on the south side of the river, and it was north from the fifth about a quarter of a mile from it and on the river bottom. At four feet from the surface I got water. From four feet to 21 feet, cemented sand, without water; 21 feet to 66 feet 6 inches, gravel and boulders, bearing water in considerable quantities. From 66 feet 6 inches to 77 feet, clay, no water. About from 77 feet to 82 feet, gravel bearing water. From 82 feet to 85 feet, clay; from 89 to 119 feet, gravel and boulders. 189 feet was the depth of that well. From 85 to 119 feet the gravel and boulders contained a good quantity of water; plenty of it.

273 Cross-examination:

I struck very little water at four feet from the surface of this well number six. Just the seepage.

Q. There was a little thread of water running by itself?

A. No sir, just seepage running from the ground. From 4 feet we had run dry again to 21.

Q. How wide was the space within which you found water?

A. You could not determine that; it might have been an inch or it might have been half an inch.

Q. But it was just a little stream of water running all off by itself?

A. No stream at all; just a little seepage in the sand that came out of the ground. I could not tell which way it came from. It came from all sides. The cemented sand from 4 to 21 feet was impervious to water. Water would not seep into it at all.

The well that I punched the hole through and let the water out was the first one I made, and was on the south side of the river, which was 205 feet deep. I punctured the casing in the well right at the bottom of the cut. The well was bored at the head of the cut, and at the level of the cut I punctured the casing and let the water out. I did it because I had orders to do so. In that well I struck rock at 193 feet, and from that on to 293 feet bored through common granite rock, not solid, somewhat split up, you know. I think probably it was bed rock. Struck water last at 123 feet. From 123 feet to the bottom of the well, about 90 feet, there was no water. After the material was showered down and got in place I don't think there ever has been any water below the 123-foot level at that place. The material that I found in the wells is not exactly the same. It varies a good deal. I cannot tell whether the clay

274 that I struck lies in strata or not. All I know is just what I found. I punctured the pipe in that well at the level of the water. I made a hole about an inch and three-quarters long and about seven-eighths of an inch wide. The water was away above in the pipe, and when I punched the pipe of course the water spurted out and it lowered it down to the cut in the pipe. I should judge the water stood in the pipe three or four feet above the puncture that I made in the pipe before I made it, and think the water ran down to the level of the puncture and continued to flow out of that hole all the time while I was there. It had a force to the

flow while I was there, but I went away after making the puncture in a little while, and did not return.

L. FRIEL, called as a witness for the defense, being duly sworn, testified as follows:

Am a civil and hydraulic engineer, and have been for 24 years; last thirteen years in Los Angeles county. Have been employed by defendants in this action to make investigations of that section of country and of the land particularly that is sought to be condemned, and have been in that business since the first of last December. Have made a map of that section from my investigations, surveys, etc. (The map is introduced in evidence and marked Defendants' Exhibit F, and is hereby referred to and made a part of this bill of exceptions. The witness continuing:) This map was made under my direction from data furnished by me, of the tract of land that is the subject of controversy in this action and sought to be condemned, and lies within the tracts surrounded by these colored lines, and marked on the inside, "Pomeroy and Hooker" in red letters. The parallel blue lines represent the Los Angeles river in its natural flow. The space marked Pomeroy and Hooker enclosed in yellow, on the northern boundary, is the 22-acre tract at the south side of lot 65 of the Providencia rancho subdivision, and
275 a part of the land in controversy. The first well bored by Nudson is marked "No. 147." About 300 feet south from the nearest point of the river and is well number one. The second is located at the point marked "No. 134," about 150 feet north of the nearest point of the river. Number 3 is marked "No. 106," and is on the 22-acre tract, about 500 feet from the river. The blue line that flows through the 22-acre tract towards the northeastern part of it indicates a small stream of water coming from the northwest and flowing into the Los Angeles river, known as the Tejunga stream. The fourth well is at the point marked "No. 173," about a hundred feet in a southeasterly direction from the river. The fifth well at a point marked "No. 194," about 800 feet from the river. This well marked "No. 196," about 600 feet from the river on the south side. It is in the bend of the river. The ditch now used by the city and known as the City ditch, diverting the water from the stream at the point marked "Headgate." The dotted perpendicular line with the numbers on them indicate the wells that have been bored on the tract of land, and also on the land adjoining. The figures on the map represent elevations above the sea level. The wells were what we term "Test-holes." They have been bored and put down from the eastern end of the tract to the western, and the greatest distance apart is about 1,305 feet, and the shortest about 250. The figures contained in the square on the map north of the land in controversy represent block numbers of the Providencia Rancho subdivision, and the one in the southwest corner is block 65. Think the elevation of that portion of block 65 within the tract of land sought to be condemned is at an average of about 505 feet above the sea level. On the eastern extremity it is about 450 feet. The black lines or hachures indicate the moun-

tains, the slope of the mountains. To the foot of the mesa
276 land or valley land of the San Fernando valley. To the mountains across the valley at the western end is about 15 miles. At the eastern end across the valley to the Verdugo mountains about two and a half miles, at the narrowest point. The greatest elevation attained by the tract of land sought to be condemned on the extreme northerly point of it at No. 180 is 470 feet. The hills on the southern side of the tract are at an elevation of from, say, 25 to 300 feet above the land on the bottom; the valley land. The plaza in the city of Los Angeles is at an elevation above the sea level of 200 feet. Water developed on this tract could be brought into the city and at an elevation of about 400 feet, by gravity. And I think about three-fourths of the territory in the city lies below that elevation of 400 feet above sea level, and the portion of the city found above that elevation would be on the unsettled hills mostly, in the northerly portion of the city. Am acquainted with the country to the west of the city, south of the Cahuenga range, and sweeping off to the sea. All of that section of country, but about 4,000 acres lying just south of the Cahuenga range of hills and west of the Los Angeles river, between Los Angeles and Santa Monica, could be brought under the water developed on this land, by gravity. The area which could thus be covered is 50 or 60 square miles, a section 12 miles long by four or five m*l*es in width. That section has no water, only some small water that comes from the Cahuenga range of hills and wells. To the east of the city the whole of the Laguna ranch could be reached by the water from this land. The line of the tunnel proposed to be constructed by the city on the land in controversy is represented on the map by the red line, commencing at the eastern boundary of the tract and running in a westerly direction to a portion of block 65, clear through the tract longitudinally, substantially. It is also marked on the
277 map "Los Angeles City, proposed main tunnel." The proposed filtration galleries are located upon the map and numbered. The first one begins about 100 feet east of No. 193 on the line of the main tunnel, and runs in a northwesterly direction until it strikes the northern boundary of the tract in question, and is marked "Los Angeles City proposed lateral number 1." We have test-holes almost on the line of this lateral, within ten to forty feet of it after we get into the mesa land. The second lateral commences at a point between station 40 and station 50 on the main tunnel line, about 150 feet west of station 40, and runs in a northwesterly direction until it strikes the northern boundary of the tract. Its length is about 1,425 feet, and it is marked "Los Angeles City proposed lateral No. 2."

Lateral No. 3 is located, commencing at the same point as lateral No. 2, and runs in a southwesterly direction until it strikes near the southerly boundary of the tract in controversy and has a length of about 920 feet, and is marked "Los Angeles City proposed lateral No. 3."

Lateral No. 4 begins at a point at No. 122, and runs in a north-

westerly direction until it strikes the northwesterly boundary of the 2,200-acre tract, and is about 1,100 feet in length, and is marked "Los Angeles City proposed lateral No. 4."

The hachures on the northerly side of the tract mark the line of the mesa all the way along. The parallel blue lines indicated in Buena Vista avenue, is a stream of water that comes down the Buena Vista avenue, and is carried in the Los Angeles river, and is marked the "Pirtle ditch." It is the aqueduct that leads to the so-called Pirtle development. The names between the black parallel lines are names of streets and avenues. The markings in the southeast corner of the tract, wherein there are a number with numbers upon them, are small wells that have been put down in
278 the tract, a few feet, or a short distance, below the level of the water. The marking is the number of the well. The elevation of the land and the elevation of the water above sea level. The map referred to is entitled "Map of the water-bearing lands of Pomeroy and Hooker, situated in Ranchos Providencia, San Rafael and Cahuenga, Los Angeles county, Cal., L. Friel, C. E., scale one inch 150 feet."

And the witness continuing: I am acquainted with the cuts or excavations made on this land, within the last two or three months, for the purpose of ascertaining what is the formation beneath and what it contains. There are two cuts, one at the eastern end, and one in the western end, in the 22-acre tract. It is marked upon the map by two blue parallel lines, a small line at an angle. It is marked "Pomeroy and Hooker's lower development." That is the eastern. The western is the same description and marked "Pomeroy and Hooker's upper development." There is a cut near the well at No. 147 of this map, which is the first well that was put down by Mr. Nudson. That cut is about 290 feet in length. It commences at the circle at No. 147, and there are two parallel blue lines running in a northeasterly direction to the Los Angeles river. The circular mark indicates the spot of the well, and that is the well where the pipe was cut to drain the water away. The cut at the well is about eight feet in depth and runs to about one foot and a half at the other end. The eastern development or excavation will average about eight feet in depth and the western about nine feet. The length of the upper development is 600 feet, and of the lower 1,500 feet. There are two weirs in the Los Angeles river, marked on this map, one in the Tejunga and three in the Los Angeles city ditch. The upper weir in the Los Angeles river is located at the point of intersection of lateral No. 4 with the river, and is marked weir. The other
279 one is about 300 feet below the eastern side of the tract at the point marked weir also. The one I spoke of in the Tejunga is in there and is marked weir, and by the side of it "No. 60." Of the weirs in the ditch, one is at the headgate and is marked "Weir No. 1," the second is below and marked "Weir No. 2;" the third is below the eastern boundary of the tract and marked "Weir No. 3." Of this 312 acres, there is a small portion near the southerly side of the block 66, that is in the Cahuenga tract. A small triangular

portion, in the easterly portion of the tract that is in the San Rafael, and the rest of it in the Providencia. The Los Angeles river flows through a portion of each of these ranchos, included in the 312-acre tract.

Cross-examination:

I suggested the title of the map. The north line of the land sought to be condemned is also the north line of Mr. Hooker's and Pomeroy's property. They don't own property in blocks 66, 68, 69, 77, 78, 79 nor 80, north of this line. The maps show the north line of the 1,400-acre tract and the south line of this tract, as indicated by the map, is a line running up on to the side of the mountain, nearly all of the way from 20 feet to 50 and sixty feet and higher. There is practically no level land south of this south line. There is a valley commences near the point represented as the round hill, and runs in a southeasterly direction, and is the valley that the road comes out of. The round hill is the one near the course marked "North 56 deg. 19 east," and no portion of the land is laid down upon this map on a distorted scale. It is supposed to scale all the same, and the same both ways. The east boundary of this land is also the east boundary of Pomeroy and Hooker's land and is the east boundary of the Los Feliz rancho. The wells and cuts have all been made recently, with a view to the pur-
280 poses of this action. Tunnels and filtration galleries are laid on this map from the maps that were furnished and lines upon the ground. I don't know of any more tunnels or galleries proposed there by the city. There is a little mesa south of the City ditch. Haven't figured on the amount. That is about all of the mesa on the south side, and you might say upon the north. All of the land is lower than the mesa or valley land to the north. The valley that I referred to south of the land sought to be condemned and southwest of the round hill, contains about 50 to 75 acres, which could be cultivated. Its elevation commences about 30 feet above the river and rises as you go south.

On March 11th, 1896, L. FRIEL recalled, who had presented and produced a map entitled "Map of the watershed tributary to the San Fernando valley," which is hereby referred to as a part of this bill of exceptions, and he testified: The map was made under my direction from Government and private surveys, and surveys that I have made myself. The map represents the city of Los Angeles, the plain lying between the city of Los Angeles and the Pacific ocean, bay of Santa Monica, the Cahuenga range of hills, the San Fernando valley or basin, and the watershed tributary to the San Fernando valley. The place marked "Los Angeles" near the southwestern part of it, adjoining the title, represents the city of Los Angeles. The broken line on the south side represents the charter boundary. The unbroken black line to the north of the line running clear across the city is the township line running east and west. The little broken line, which is north of the heavy

broken line, is the patent boundary. The distance between the patent and charter boundary is about 1,800 feet. The large broken line extending around the exterior of the map includes the area of watershed that lies above the Pomeroy and Hooker land. That line extending clear
281 around to the northeast corner of the red lines shows the exterior of that watershed tributary to that basin. The red lines, with which the broken line connects at the northeast corner, is the line of the San Rafael rancho. The green lines to the southwest of the San Rafael are the exterior boundary lines of the Rancho Los Feliz, and the yellow lines in which is written "Ro. Providencia" are the exterior lines of the Rancho Providencia. The square in about the middle of the Rancho Providencia marked "Cahuenga," is the small tract of land known as the Rancho Cahuenga, or Cahuenga tract. The Little Tejunga creek is represented on the map and marked Little Tejunga creek, or Tejunga cañon. The blue line running southerly and almost parallel with the Cahuenga range of hills until it comes to the eastern point of the hills, and then southerly to the city of Los Angeles, indicates the Los Angeles river, and is marked "Los Angeles river." The line indicates the stream of the river, about fourteen miles westerly from the eastern boundary of the Cahuenga range of hills. I could not say whether that is as far back as the river course extends at present. The river rises or commences to rise at the foot of the Cahuenga range of hills, towards the western end of the Cahuenga ranch. The San Fernando valley runs north of the Cahuenga hills, west of the Verdugo hills and south of the San Fernando. The place marked mission with the figures 1031, represents the location of the Mission San Fernando, and the elevation above the sea. The tract sought to be condemned lies near the southeasterly corner of the Rancho Providencia, a portion of it is colored yellow on the map, and is marked Pomeroy and Hooker, and the other colored a reddish color the 26-acre tract. At the western and southwestern extremity of the land. The spot marked "lake" on the map is a laguna upon the western line of the Rancho Providencia, and about a quar-
282 ter of a mile north of the Los Angeles river. The large figures on the map represent elevations above sea level. The road marked Southern Pacific railroad, is the line of the Southern Pacific to San Francisco. The map is constructed on a uniform scale of two inches to a mile. The place- marked "Olivewood" and "Colegrove" are on the southern slope of the Cahuenga range, and not within the San Fernando watershed. The spot marked "Chatsworth well," is a well that it is said Mr. Nudson put down for the Chatsworth Park people. The place- marked Garnsey and Foreman wells, represent the location of wells bored by Mr. Nudson for those men.

The blue-shaded and yellow-marked wash, with the blue line through it, is the place of the stream of the Tejunga cañon. The blue line represents the stream. The Arroyo Seco is marked on this map, unites with the Los Angeles river inside of the city limits, so that the watershed of the Arroyo Seco does not empty its waters, so

far as I know, into the San Fernando basin anywhere. The confluence of the Los Angeles river and the Arroyo Seco is six or seven miles south of the land in controversy. The various black lines on the map and the light yellow enclosed within some of them represent the sandy washes running from the northerly side of the San Fernando valley southerly. Those washes are only the portions shaded light yellow. The black lines are the banks of the washes. I don't know whether there is any water at the place on the western boundary line of the watershed marked "Spring." I located that from Government maps. It is just about the line of the watershed; I think outside of it. The figures 500 in the Pomeroy and Hooker tract represent the elevation above the sea level. This is five-hundred-feet contour line. Dundee and Roscoe are stations along the railroad.

283 Cross-examination:

The places delineated on that map are correctly located, I think. I know of my own knowledge of the greater portion of the watershed of the San Fernando, but I don't know all of it. I have taken the other from the Geological Survey and from the Wheeler survey. What I didn't know myself I took from Government surveys, as laid down on a map furnished by the Government in the Wheeler survey, and furnished by the Government in the Geological Survey. I procured the map from the Government offices. They are copies which are distributed by the Government on request to citizens. Have had experience in laying down points from these Government maps for the last three or four years, especially in the San Fernando watershed. Not especially in other places, Government maps of this class may be in general inaccurate, but I know in reference to this Geological Survey that it is very accurate. I know the points laid down here are correct. When I testified as to the points where the Los Angeles river rises I meant the point at which the water first appears on the surface and flows. That is somewhere north or west of the Encina rancho. I could not locate the exact point at present, but about seven years ago I made a trip along the south boundary of the San Fernando valley and went northerly around the head of the stream, and from my knowledge the river first shows upon the surface about thirteen or fourteen miles to the west of the tract of land sought to be condemned. My opinion is that most of the water, if not all of it, that is discharged from this watershed comes down and passes out through the narrow piece between the eastern end of the Cahuenga range of hills and the Verdugo hills.

284 Redirect:

Have made calculations of the areas of the different characters of land in the tract of land sought to be condemned. Acreage covered by the Los Angeles river is 11.50; mesa land, 48.50; second bench and willow bottom land, 21.42; the mountain and hill land, 18 acres; making a total of 288.42 acres in the Pom-

eroy tract, or in the larger tract. In tract No. 2, of the southerly portion of block 65 of the Providencia the acreage covered by the Los Angeles river is .35 acres; willow bottom and second bench, 26.05; a total in block 65 of 26.4. Altogether 314.82 acres.

Recross-examination:

I calculated the amount of acreage covered by the Los Angeles river as it existed on the day we made the survey about three weeks ago. By mesa land I mean the second bench of the land running back to the mountain. Character is sandy loam in most places; nearly all of it. It is about twenty-five or thirty feet above the level of the river. From the south line of the land sought to be condemned at about Verdugo avenue, is about a mile and a quarter. To the mountains beyond that about nine or ten miles. From the south line of the land sought to be condemned in a northeasterly direction to the nearest point to the mountains would be about two miles and a half. Continuing the line as shown on the eastern end of the lower tract, you would strike the Verdugo mountains about two miles and a half.

A. K. NUDSON, recalled by the defendants, testified: Have sunk other wells in the San Fernando basin for other parties, besides Pomeroy and Hooker, higher up the valley; scattered around in different portions of the valley. Bored a well near Chats-
285 worth park. Kept a record of the different stratas of some of them. Kept a record of the Garnsey and Howells wells that I made for them. It was bored since 1893, but not within the past two years. The first well I made in San Fernando valley was in May, 1891, for a man by the name of Salisbury, and then various men since. From the top down to twenty-eight feet I had sand and soil. At twenty-eight feet a little water. This well I bored on Seventh street in the Lankershim ranch. That is in the San Fernando. I should judge about four miles in a northwesterly direction from the land in controversy. It is on the plain and north of the Cahuenga mountains. From twenty-eight feet down to fifty-six feet I had clay and gravel mixed. From fifty-six to eighty-nine feet I had water-bearing gravel. That was the end of the well. The character of the material that the water was in was sand and gravel. The lower down I got the coarser the gravel. That well is in use yet; has a windmill on it. I bored two wells for Mr. Foreman close to the lake, and a little north of the river, about two miles from this tract of land. From top down to nineteen feet sand and gravel, and little water at nineteen feet. From nineteen to forty feet cemented gravel and a little clay mixed once in a while; no water in that. Forty to forty-three feet clay, no water. Forty-three to seventy-five, sand and gravel; coarse gravel in the bottom and abundance of water. That is the first well, and the second was just about the same material, only I went sixty-nine feet. They were bored in 1893, in November. I bored another one, the same year, for a farmer up on Second street. Don't know his name,

and have no record, except I got water at twenty-two feet, and finished the well at sixty-five. The wells I bored for this farmer are probably about three miles from this land, and on Second street, in the San Fernando valley, in the Lankershim division. About three miles from the station in a westerly direction on the north side of the river-
286 and probably a half or three-quarters of a mile from the near est point of the river. The next well I bored was at Chatsworth park for a man by the name of Brown, in February, 1894. I don't know how near it is to the river. From the top down to 119 feet found sand and soil, few boulders, one streak of clay about ten feet thick and at 119 found a little water. From 119 to 157 is gravel and clay. At 157 I got the second water in blue sand and gravel, extending down to 179 feet, and water all the way from 157 down. On August 29th, 1894, I finished a well for Garnsey and Howell, on the Maclay rancho, about three miles west of the Pacoima and five miles south of San Fernando. From the top down to 100 feet I found soil and sand; 100 feet to 150 sand and some gravel and some boulders. At 150 feet got first water. From 150 to 197 clay and cement; no water. At 197 got the second water in sand and gravel and from 197 to 228 sand and gravel, with plenty of water, and stopped on top of clay at 228 feet. Those are all the wells I bored.

Cross-examination:

I found very much the same general formation throughout all the places where I bored wells. Varied a little. It seems the whole valley is very much the same ground. Got water up there at a further depth than on this land sought to be condemned On the Pomeroy and Hooker land got water nearer the surface. Had more boulders on the Pomeroy and Hooker land and larger ones; and on the Pomeroy and Hooker tract first struck the water in sand. I got water in the sand in these other places where I bored. It was after getting through the surface sand that I struck the water on the other. I found soil and sand in Garnsey and Howell's wells down to 100 feet. Same soil as was right on top. Similar to the
287 sand and soil on this tract. Some parts of this tract it is sandy, and on the other land the soil was harder and freer from sand. Part of the Pomeroy and Hooker land was about the same, showing sand on top. That is on the mesa. I remember some on the mesa.

G. O. NEWMAN was recalled as a witness for the defendants and testified as follows:

Am a civil engineer. Made a study of hydraulic engineering. Been engaged in that branch of the science since January, 1875, at Riverside, Orange, Santa Ana and Bear Valley. Have investigated the Pomeroy and Hooker tract sought to be condemned in this action. Been at that since the last of November. When on the land the 30th of November last, and examined it all over. Directed what should be done to practically demonstrate my ideas of what

water could be developed on that land. There have been two cuts put into the ground. One at the lower end of the tract and one at the upper, and after that put down a series of shallow wells to ascertain where the sheet water of that land stood, and how much it would be lowered by putting in a cut in the ground. The lower cut is 1,500 feet long, and the upper is 600. There were a good many wells sunk and a good many over a hundred. The wells were put down before the cuts were made. The watershed of the San Fernando valley is something over 480 square miles. Have examined the cuts and wells that were sunk there for the purpose of ascertaining the trend of the waters moving underneath the surface of the ground in the Pomeroy and Hooker tract. At the upper cut we took a cross-section from these diagrams of Mr. Friel's to ascertain how much of that cross-section was drained by this cut. After that we took and platted and geographically determined of the water as would come in through that cross-section, and what course that would take to strike the ditch; and after we had ascertained the
cross-section of the water from that cross-section to intersect the
288 ditch, we put in a weir there and carefully measured how much water had been developed through that cross-section. The amount is thirty-five-hundredths of a cubic foot per second. We took before that and ascertained how much water that kind of ground could contain. I made several experiments of that, and found that a third of the material was water, so we took the actual water area, deducting one-third of the cross-section and got at the water area as moved in that cross-section, and from that we divided the area in the quantity of water as was running from the weir, and certainly that gives us the velocity in feet per second as that amount of water had to move. We can determine approximately the velocity of the water as it moves through the material that we found there. I am speaking of the velocity of the water after I made the cut. That is, you must understand that that amount of area as we could drain from that cut is supplied from the watershed of San Fernando valley, and this diagram shows that when you make a cut you lower the sheet water according to a certain curve, but you don't lower the water further back. You can only get out of such a cut as much water as is supplied from the valley adjacent. The experiments that I made demonstrated the velocity of the water after we made the cut. It does not show how the water was moving before we made the cut. This is not the velocity of the water in the cut, but the velocity moving in the ground after the cut was made and near the cut. We have made some experiments and have put in these cuts to get at the velocity. Now, that velocity shows pretty large, a thing as I told Mr. North before we made these cuts, I said from the lay of this ground it isn't alone the percolation that has supplied the rate, from the side I mean. The water must be pushed up, and the experiments as I made here gives the velocity as shows to me surely that the water
not only comes in from the sides and the end of that
289 cut, but also comes up from underneath. That the pressure below has raised it to a certain height underneath, then it

stops raising and then flows off. I can determine approximately with what velocity it goes off, but I haven't done that yet. I have only ascertained the two different grade lines. From my investigations of that country, the direction in which the waters of the watershed of the Los Angeles river make their way through the country is first it runs through the San Fernando valley until it strikes the hill on the south side of the valley, and then flows easterly along the foot of the hills. It strikes the Cahuenga range of hills all along the north base of those hills, and turns to the eastward pretty close to the foot of the hills, and the course of the waters through the lands which are in controversy I should think is mostly easterly. The contours of the maps show that some of the waters come in from the north sides. I am speaking of the subterranean water.

Q. And then what course do they take after passing through the land?

A. It must follow in the trend of the river along the lowest ground, in the same general direction as the river. It is my opinion that most of the water of the San Fernando watershed comes out through the gap about the land in controversy between the Verdugo mountains and the Cahuenga range. It is my opinion that most of it passes through that, if not all. There is no other way to my knowledge by which they can pass out. I have examined the water records which have been handed me, and in my judgment the average rainfall from the area of the watershed that supplies the Los Angeles river from this point on the Providencia ranch, or the eastern portion of it northward and westward must be about 24 inches, and according to my judgment about 19,000 inches of that should pass through that gap. I mean average rainfall of 24 inches; 24 inches of
290 rainfall, and by 19,000 inches that pass through this gap, I mean inches measured under a four-inch pressure. I wasn't using the word "inches" in the same sense when I spoke of the 24 inches. That is rainfall. An average of 24 inches of rainfall would represent a constant flow for the year round of 858.7 cubic feet per second. I take out of that 45 per cent. as the amount which should go out through that gap. Fifty-five per cent. I allow for the run-off, and the evaporation, and the 45 per cent. that would flow down through that gap, as subterranean water. There is an average rainfall of 24 inches per annum. The volume of water that would be required to carry that off, measured under a four-inch pressure, running for the same length of time, that is for a year, is pretty close to 43,000 inches. I allow 55 per cent. now for the run-off and evaporation. That is about 23,600 inches, and leaves 19,300 inches, and in my opinion that amount passes off by this subterranean flow, through this gap. In what I call the run-off I include the ordinary stream of the river on the surface. That is, I include in that the ordinary flow of the water as the surface flow from the storms, and constant flow of the river the year round, and leaving 19,300 inches, about, that passes underneath the surface of the ground through this pass constantly the year round.

Have had experience in developing water in the Santa Ana river for the Riverside Water Company, and from looking at it and ex-

amining it over at Etiwanda, where they develop some. Am acquainted with the methods of developing subterranean waters. Am acquainted with the general plan proposed by the city of Los Angeles for the development of the waters upon this tract of land. In my opinion, there can be developed upon those plans by works constructed properly, without diminishing the surface flow of the Los Angeles river at all, about 3,000 inches, measured under a
291 four-inch pressure. I have examined the manner in which the water comes into these excavations upon the tract of land in controversy, and the experiments that have been made in sinking wells upon this tract. The water in this particular ground seems to move in two different directions. The water coming down from the San Fernando valley strikes the hill with one grade line, and after that by examining the top of the other grade line we find that it goes off with a slower grade line; and certainly when we put in a cut in that ground, we can nearly get as much water as is supplied either from the side or from beneath to what cubic contents of ground as we can intercept with that cut. It flows or seeps into the cut from all sides and from the bottom, and after that flows down the cut.

Q. You spoke this morning of the waters coming into that cut by an upward pressure. What, in your opinion, is the cause of that phenomenon?

A. That the water as coming with a certain grade line strikes the hill, and after that have to move hastily on to another grade line, on a lower grade line, and certainly that is a tendency to raise that water up. That would not be so if the point at which the water coming in contact with the hills admits of an easier passage than the material through this lower grade line, then it would move on the same grade line as it had before.

Q. Now, in your judgment, does the fact of the resistance opposed by this mountain also enter into the causes of the waters coming up from underneath?

A. Well, that is just what I said before. The water strikes that mountain, and if it cannot flow off hastily there, it would raise above the top of the ground. But now, it moves hastily along the river but on a slower grade line, so that naturally it would have to have a more rapid motion to be able to get through the same area. The water certainly comes from the whole of the valley there against those bluffs, and there we can see by the contours
292 we have taken, or the levels of the different water slopes, that that water is crowded in there into a narrow passage, or to a narrower space, than what it had before, and consequently there it got to either travel faster through that material or it got to raise up.

Q. And the fact that it rises, does that indicate that it cannot travel faster through the material?

A. Well, it raises up and it travels faster, too. And at the point where it is raised up it travels easterly. It is raised up on an average about three feet.

Q. How does the level of the subterranean water in this tract of land compare with the level of the stream of the Los Angeles river?

A. It is about three feet higher.

I know the well sunk by Mr. Nudson, in which, at a depth of about 119 to 123 feet the water was raised five or six inches in height. It is at the point marked No. 147 on Exhibit F. It is a ten-inch well.

Q. I will ask you, whether or not, in your opinion, or in your knowledge, from the laws which regulate and govern the movements of water, the water would have raised or stood in that well if the resistance met with by the material underneath was not greater than the amount of pressure necessary to raise the water.

A. Well, certainly, that well, as we have heard, was full of water almost to the top of the ground, and he came into the strata as raised that water some distance. That illustrates that the material that that water was flowing through underneath held the water back, and that it was easier for the water to raise up whatever distance it did in that pipe, than the pressure through that underground material. If, in boring that well, the machine had entered into an open, defined channel of water, the water would certainly have gone off in the stream. In the cuts such as are here,
293 you can go along the cut and see the water percolating in both from the sides, the end and the bottom. That is not confined to any one place, but is general throughout the whole length of the cuts. I measured the water in the cuts. In the lower cut we measured it in two places; in the upper cut in three. The lower cut is 1,500 feet in length. We measured the water near the head of the lower cut, and there were 25.53 inches. That is about 200 feet below the head. Right immediately at the head we didn't measure it. It is pretty hard to estimate very closely how much there was right at the head, because really right at the end of the cut there it first begins with a pretty fine percolation, and in a pretty short distance it increases pretty fast, and 200 feet below the head we found 25.53 inches, which was to ascertain how much the cross-section of the area drained would furnish that country at the head of that cut. At the lower end of the cut where we measured there was 121 inches. That was at the extreme lower end. The increase between those two points of measurement in the cut was a gradual increase all along the cut. There was no difference discernable at different points at all. I meant by that there was no place where you see water coming in any faster than at any other place; that it was a percolation visible all along the whole of the cut.

By the COURT:

Q. It came in, though, in little streams that you can see, didn't it?

A. Yes, certainly it gathered, and before it struck the surface of the running water it could go in little streams.

By Mr. CHAPMAN:

Q. Those little streams that you could see are simply the accumulations of the waters pouring in from the sides.

A. Well, certainly.

By the COURT:

Q. Are there not some places along that ditch where you can see that the water comes in more freely than it does at others?

294 A. In some places there where in building the ditch was scraping out, and these depressions where they went out with the scrapers, it is a little flatter than the general bank of the trench.

Q. I am not referring to those places.

A. And in these places you can see the streams gets a little bigger and look bigger, but otherwise it is a pretty uniform increase all along the ditch. There is some little difference in the formation of the bottom of the ditch as to the size of the gravel and boulders and things. It may come out more freely where the gravel and boulders are larger than at other places where it is finer, but still honestly when we went along there to examine it to me it appeared if there was any extra great flow some places there I would have measured it.

By the COURT:

Q. I don't mean any very great difference, but some difference so that you could notice it?

A. Yes, you can see that maybe it was percolating a little faster in one place than another, but still it is pretty uniform all along the ditch or trench. The first time I measured in the upper cut I measured in two places, one at the mouth and the other half way up. There were 76.5 inches at the mouth and 32.7 in the middle. At a later date I went up there to measure to ascertain the rate of velocity. Then we measured near the head of the cut and made it 17.97 inches. That was 170 feet from the head of the cut. The first measure in that cut was made on February 16th, and the last one on March 1st. At this last measurement I didn't measure the flow at the other places to ascertain whether there had been any diminution of the last measurement, any perceptible diminution, but at the lower cut I measured one other date to ascertain if it was any different and it was virtually the same. The increase in the upper cut was from 17 inches to 76.5 inches. That is, the 17 inches at 170 feet from the head, and 32 and something about the middle, and the cut was 600 feet long. I have been

295 all along that cut, and the rate of increase of water flowing in the cut is very gradual. It shows. The measurement in the middle is approximately half what we got at the lower end. I have not been to every one of them. There was water in every one that I looked into, and every time I looked, and I looked at that most every time when I have been on the ground, extending from February 15th to yesterday afternoon (which was March 10th, 1896.) I never saw them when water was not standing in them. Independently of the cuts and the wells that were bored, I could determine from the general appearance of the country there whether there was water in the land or not. I was satisfied when I went on the ground on the 30th of November that there was water and the question was how to be able to show to some one else that there

really was water in there. The indications that satisfied me there was water, was the topography of the country, observing the Los Angeles river. I observed both in the sides and bottom of the river how the water was percolating into the river. I made some measurements of the quantity of water flowing in the Los Angeles river myself. On the 15th of February there was flowing in the Los Angeles river at the western boundary of the tract of land in controversy 1,068 inches, measured under a four-inch pressure. That was near the upper end of the land and below the mouth of the Tejunga creek, and about 150 or 200 feet below the mouth of the upper cut, and only a short distance from the western boundary of the land in controversy. At the point where the Los Angeles river leaves the land in controversy, at the eastern boundary, there was 2,057.9 inches. I have not been all along the river, but I have seen it at very many points along this land. There is a small surface water comes flowing into the Los Angeles river from the western boundary of this land to the eastern. It comes in from
the north side, right under the bluff of the mesa land
296 there. There are only about seven or eight inches flowing
in it. That is, to my recollection, about the middle of the Hooker tract, half way between the two cuts. This Pirtle development water is running into the river in two places on this land. What they call the west branch comes in just a little below the upper weir, and there was 70.75 inches and from the east branch 202 inches, making altogether 272.75 inches. The difference in the amount of water flowing in the Los Angeles river at the points where we measured it on the western side and the point on the eastern side, is 989.89 inches, and the increase from sources other than the surface flow into the river is practically 700 inches. The water which was running in the ditch at the same time was 473.06 inches. That is not included in the 2,057 inches, but is to be added to it. The total increase, taking out what was coming in and what was taken out between the western and eastern boundary, is 1,081.63 inches. The water that was flowing in the ditch when I made the measure, continued to run when I made the measurement at the lower point. The 1,081.63 inches of increase, according to the measurements, take into consideration the 473.06 inches, which was diverted by means of the ditch. The elevation of the Pomeroy tract on the westerly line is 493.12 feet above the level of the sea, and on the easterly line 450.7. Of the 19,000 inches, measured under a four-inch pressure, furnished by this watershed, and which constitute the subterranean flow through that gap, I should judge at least two-thirds of it flows through the tract of land in controversy, and the remaining one-third passes out to the north of it. The shortest distance across this narrow opening between the Cahuenga and the Verdugo, is about two miles. I know where the ditch that is used by the city of Los Angeles connects with the river upon the Pomeroy and Hooker tract. The head of
the ditch is near the center of the 314-acre tract. It is
297 about 2,900 feet below the upper cut, and about 1,550 feet from the head of the lower cut to the dam by which the water

is diverted into that ditch. The ditch is about 1,700 feet from the cut at the nearest point. The effect of the flow of water in that ditch in increasing the quantity of water into this lower cut, is certainly very little, if any. I was up on this ditch yesterday (March 10th.) There was 48.9 inches flowing in it the headgate, and in the ditch at or opposite this lower cut due west from the upper end of the cut, there was flowing in the ditch 22.5 inches. I observed the water flowing in the cut at the same time and could not see that it was affected any. We had to take a weir from another place and put it in, and we could not get it down. We had to set the weir pretty high so that we had to back the water unusually high, and still it measured 115 inches in the cut, instead of 121. It got late and we didn't want to wait for it to raise, but I was satisfied that there was just as much water in the cut now as there was when I measured it in the cut, but at which time there was 473 inches in the ditch. We backed the water up to this weir in the cut between 450 and 500 feet. That had some effect upon the percolation from the sides into the excavation. The effect would be to diminish it. The cut is a little over 200 feet from the river, at the nearest point, and where the river makes a bend toward the cut. The water in the lower cut is not, in my opinion, affected by any flowage or percolation from the river. The reason I think so is because the water of the saturated plane stands fully three feet higher than either the water in the river or in the cut.

Q. At what place does it stand three feet higher?

A. Between the cut and the river. At every cross-section, at every place where these rows of wells shown on Exhibit F, it shows in every one of them that the water stands higher in the ground
298 than between the river and the cut. I do not think the water that is percolating into the upper cut is affected by any percolation from the river or the Tejunga stream. I think so for the same principle as is shown on the lower cut. The same kind of wells is put in across the upper cut that is in the lower cut, and the water stands higher between the Tejunga creek and this cut, and higher than between the cut and the river. I have estimated the cost of developing 3,000 inches of water in this land by such works as would be necessary or proper to avoid lowering the quantity of water in the Los Angeles river, and in my opinion it would cost about $100,000. In all my investigations I have not found any such thing as a defined water course or channel in which water is flowing beneath the surface in that section, as far as my investigations went. There is about one-third of the material of the earth there that is water, that is upon this Pomeroy and Hooker tract, and of the ground such as we found it in the bottom of these trenches. Am acquainted with the values of real property, and I know the value of water for irrigation purposes, and I should say that there is no question but that water is worth at least $500 an inch, and as I measure that there could be 3,000 inches developed from these galleries, 3,000 inches at $500 an inch is one million five hundred thousand dollars. In making that estimate I mean it is worth $500 an inch on the land undeveloped. The amount of water

flowing into the city ditch would not have any effect upon the amount developed in the upper cut, and the amount developed in the lower cut is 121 inches, and in the upper 76 and a half. The upper development produces a greater amount of water per foot than the lower.

By the COURT:

Q. Mr. Newman, I want to ask you one question before the cross-examination begins. When you speak of a well-defined stream of water under ground, what do you mean?

299 A. A stream that has banks and bed and flows like flowing water does.

Q. Then, according to your ideas, there is no such thing as a well-defined stream under ground, unless it is flowing in a cavity in the rocks or something like that?

A. No sir. Not to call it strictly an underground stream.

Q. You don't recognize any stream of water flowing through coarse gravel or any flowage of water through coarse gravel as a stream at all?

A. No sir; it is not a stream.

Q. That is percolating water?

A. Yes sir.

By Mr. CHAPMAN:

Q. Well, I will ask you as a supplement to that, do you, in your definitions, include in a water-course anything that is only one-third water?

A. No sir. You can't call that a flowing stream.

Cross-examination by Mr. DUNN:

All of this land will not alike contain one-third water and two-thirds other substances. There may be a little difference in that land. There are large bodies of this land under ground that contain almost no water, and others that contain much more than a third. I gave the number of square miles of this watershed at 480, and upon that watershed I based my figures. The rainfall per annum on the watershed, the average I gave as two feet. I took that from the statistics here at Los Angeles average 17 inches and from what I know of the amount in radius, as it is fully doubled up at Arrowhead and at Bear valley, what falls up in the mountain, as compared with what falls in the valley. The area in the mountains is about three times as much as—or two-thirds of what it is in the valley, consequently there is—twenty-four inches is, in my mind, the minimum average rainfall. The 24

300 inches is, in my opinion, a conservative estimate. Following out my argument, thirty inches would come nearer to the figures. That would just about be the figures, and that being the case, the amount of water running through this valley would be greater than 19,000 inches, measured under a four-inch pressure; it would be a fifth more, or practically 25,000 inches, and about two-

thirds of that runs through this land, in a general easterly direction; following along the contour of the mountains, or of the base of the mountain. Follows a direct line as near as the mountains will permit. I have not considered what the effect on the amount of water produced would be if the cuts were made crosswise instead of lengthwise of the tract. If I should lay out some tunnels therein to develop water on that tract, I should usually lay them lengthwise with that land. If the cuts were crosswise I rather think you would get less water. One cut would cut off some of the supply for another if you put them close together. If you were to build a dam to bed rock across the eastern end of this land and run a spur of that dam up to the Verdugo mountains, following the bed rock, you would very likely get all the water in this watershed. If you would run such a dam around the upper end of the Pomeroy and Hooker land you would not catch two-thirds of it. Some of the water would be forced to go around the dam and go through the balance of the space in the gap. After the water comes out of this land the direction of its movement is easterly. I can't tell what proportion of that water that comes into the land comes in from the foot of the hills and what proportion comes from up above down into it directly from the north. The greater portion of all that water has got to strike that hill before it begins to turn. I think the greater portion of the watershed strikes the hills west of this land and follows the same general course that the surface water does, along
301 the base of the hills. I can't tell what proportion of 15,000 inches that comes into this land comes from the north and what comes from the base of the hills. The water in the Pomeroy and Hooker tract, in my opinion, above the plane of those cuts, moves between 14 and 17 miles per year. That estimate is made on the ground that lies above the elevation where this lower cut enters the river. That is the only land we have been able to examine, as all of the land lies above the elevations where the lower cut enters the river. How fast the water travels below that I don't know.

By the COURT: Now, I understand he don't mean the water that lies above that in the river, above that geographically, but above that vertically.

A. Above that horizontal plane, or above that plane as we can intercept it by running in a tunnel. The water then which the city would intercept in putting a tunnel in, in my opinion, moves from 14 to 17 miles a year. That tunnel would be at the upper end, about 32 feet in depth, under the water plant, and the water which would be intercepted at that point would run from 14 to 17 miles a year. At the point where the tunnel is 32 feet below the water plane, it is a little below 40 feet below the natural surface of the ground. There is some water yet in this ground below the proposed tunnel. The wells have shown that there is water further down than 40 feet. The water in the San Fernando valley comes from this same watershed; comes into its position or place in the same manner that the other water does; runs through about the same material. They show in some places a little coarser material. The

material seems to keep changing, lays in strata. The water that moves down the San Fernando valley, I could not say if it moves faster or slower, because it has a much greater body to move through. The grade line shows there that it has a heavier grade than the one down below. Whether it would move
302 faster in that case depends on the resistance in the ground and that depends on the material it would travel through. It would move faster in the same material where the grade line was greatest.

Q. Well, the material, as I have said, through this tract, is about the same, isn't it, all of it; that is, it will run in a general way about alike?

A. Well, you can say in a general way. Still, we have seen by our borings and the level of the water, especially from the bigger wells, that the grade line of the water coming down the San Fernando valley has a broken grade line, and certainly that is only on account of the different resistance that it meets. It is shown by some of these deeper wells that some of the strata are perfectly impervious. In making my estimate I have not figured at all as to the amount in which water would run freely and the amount which was impervious to water. The way I went at it: I took the increase in the lower grade as that was the smallest, and after that I extended the increase up through the water-bearing strata, and as I found by plotting from this observation of Mr. Friel's, and that that increase when I plotted it, made exactly a straight line. Take a string and lay over them points, and it was exactly straight. Well, then, it was very reasonable to suppose that I could carry that increase on in that same ratio through that water-bearing strata. I can't tell how much of the ground above bed rock, between bed rock and the surface, is water-bearing and how much is impervious to water. There are layers or streaks of water-bearing soil, and then possibly a streak of cement, sand or clay. The water-bearing soil is composed in some instances of sand and gravel and in others of boulders and gravel. The water flows more freely in some of these strata than in others and I think flows the more freely in the coarser material. Have not approximated in my mind as to the amount of this coarse material. There may be many
303 causes that the Los Angeles river flows on the surface. In some places where those underground strata—where the water percolates through it, strikes a more compact material, and it has got to raise up to seek more ground to percolate through, and if that more compact material is enough of it, it will shove it clear to the top of the ground and it will begin to flow as a flowing stream. That is one of the causes that may account for it. Again, it may be that where a river has a big inclination like the Los Angeles river, it may be that it cuts some of these water strata as we know is separated by little clay strata. It may be possible that it cuts off one of them, and that they empty right out into the stream on account of the inclination.

Q. You mean one of those water-bearing strata that you speak of?

A. Well, some ground where the water percolates freely through.

Either freely or slow. But when it is out, it will show on the ground.

By the COURT: You mean where the inclination of the stream is greater than the inclination of the strata?

A. Yes, it would cut them. This water of the Los Angeles river has all of it been under ground in this water plane, I think, and has come up from them by reason of the various causes that I speak of, and shows on the surface. The bottom or bed of the river through this land is mostly sand. It is undoubtedly water-bearing itself. Right in this particular place you can see the water percolating into the river from both sides, and from the bottom, so that the strata under the ground immediately under this river in this land is full of water, and is forced up through it. If it was this same loose gravelly material and there was no water in it, the river would sink down into it. I have never been in the vicinity of the Los Angeles river dur-
ing a time of flood. Have formed an idea of what
304 the run-off from storm water would be, from this watershed
in a flood. Base my figures from general observations of other rivers. We have a river right at Riverside very similar to the Los Angeles river, that is the Santa Ana. It comes up very suddenly, carries an immense quantity of water, and inside of a few hours is down again. Have seen the bed of the Los Angeles river and the levees as it runs through the city. Have not measured the width but should judge it must be 400 feet. Estimated the velocity of the river in flood time to be ten feet a second, the width 300 feet, the depth of the water ten feet, it would flow 30,000 cubic feet per second, which would be one million five hundred thousand inches, under a four-inch pressure. When the water flowing under ground comes into this land on one grade line and then out on a slower one, as I testified, I meant that the grade line of the San Fernando valley of the water plane, as we have got it from these different borings, that it is nearly double as it is moving in the other direction. Then the effect of that upon the velocity is, if the water don't raise clear to the top o- the ground and flow a living stream, it has got to travel faster through that material. It has got to get away one way or another. The 13,000 inches flowing underneath the soil, as has been stated, of this Pomeroy and Hooker land, may flow faster or slower after the grade line is lowered. It depends on how far it spreads out again, how deep it is. It may be so deep that it don't travel any faster when it gets underneath. If the bed rock is the same depth it has got to travel faster. If you crowd it into a smaller place it has got to travel faster. When I call that a slower grade line I meant it was not so steep an inclination. In examining the cuts I can't tell whether the greater quantity comes into the cuts from the sides or from the bottom. It comes in from
the bottom all over. You can go along and see little
305 white pebbles jumping in the bottom of the cut, showing
that there is streams coming in from the bottom as well as from the sides. These places where you can see it are quite numerous. I could not tell whether they are every inch or every three

feet. They do not exist everywhere within an inch of each other. You may see those bubbles every 12 or 15 feet. It does not bubble so strong. It is just as you can see the motion of the bubbles. It comes in from the sides about the same way. Seems to percolate in pretty gradually all along. You can't see the same motion in the bottom that you can on the sides. On the sides you can see the water coming right out and see it flow, little rivulets coming into the main stream. I spoke several times of the fact that the water plane between these ditches and the river was higher than it was either in the ditch or the river. The reason for that, in my opinion, is the fact that this water coming on this heavy grade line and having to go off on a slow grade line, kind of piles up there to find space enough to travel through; and certainly it is kind of upward motion, as it strikes the foot of that mountain, and has to turn and go in another direction. And as it shows both in the river and the cut that water keeps coming up from the bottom. I know that you don't generally see that in the ground where it don't exist under a pressure. There is a point where that ditch and the river are only 200 feet apart. The lower ditch or excavation, and still the water plane between the ditch and the river is three feet above either the ditch or the river.

Q. Will that stay so if that ditch is left there?

A. It has stayed there now for about a month, and has not changed. If anything it is raising higher just lately. And, in my opinion, that water plane will stay very nearly the same. The water at the point between the ditch and the river where it
306 is three feet higher than the river, is moving. Moving along at the same general rate as the rest of it, and in the same general direction. I got the rainfall from the Government Weather Bureau in Los Angeles. I don't know what the rainfall in the San Fernando valley is, as a matter of fact. Haven't seen the statistics in the San Fernando valley. Assumed that the rainfall in the San Fernando valley was something near the city of Los Angeles. I compared the valley with the mountains such as we have it over in San Bernardino valley. Have heard there was a rain gauge in the San Fernando valley somewhere; and that they have been trying to get hold of it, but I didn't find out what it was. Never read Hall's report of the rainfall in that valley, nor consulted any statistics of the rainfall up in that valley. I started on the basis that the San Fernando valley had 17 inches of rainfall, and that the mountain area had twice as much rainfall; that two-thirds of the whole shed was mountain area; that the area of rainfall in the mountains was two-thirds of the whole area. If the rainfall in the San Fernando valley were 11 inches, my figures would come down accordingly. In figuring on a mountain rainfall I have based my figures that it is twice as great as in the valley, from what I have observed for years, both in the Bear valley and Arrowhead. Bear valley is 4,600 feet above the sea level and Arrowhead a little less, but don't remember just what. The San Fernando valley is 6 or 7 hundred feet and keeps going up from the lower end of the valley. The San Fernando valley is higher than the city, and for that reason I thought

it safe to assume that it would have a little more rainfall. Am not familiar with the rainfall in the territory east through the Soledad cañon above San Fernando. Know of no observations or records there. I only know that it comes down there in big waterspouts sometimes, but don't know the annual rainfall. In
307 my estimate that 3,000 inches of water could be developed upon this land, at a cost of a hundred thousand dollars, the general plan upon which I would build those works would be tunnels, or open cuts, following to some extent the plan laid down upon that map by the city in a general way. The city seems to have planned to draw from the river, and if it should be developed independently from the river, you would have to change the plans somewhat. To change the plans so as to draw from the river, I would locate new tunnels, so far as I could, from the river, and where it came anywhere near to affect the river, I would make the tunnel tight. I have not given close study as to just where to put the tunnel. All I can say is I would try to get it as far from the river as I could, without I wasn't wanting to draw from the river. I would put it on about the same grade as the city proposes, because that is, in my mind, a proper grade line. About 32 feet below the water plane. The tunnel which I would put in would affect the water plane in different shape in different places. It don't affect it the same all over, because we are at different depths underneath. If you were running a tunnel 32 feet under the water plane, lengthwise of that land, you would affect the water plane on each side of it something like three of four hundred feet. Those wells we put down along those cuts were put there to get at the curve that water takes from the water plane, to see what ground absolutely would be drained by cutting into the land. You see the whole of them shows that this curve goes back for a certain distance, and gets a little longer according to the depth. That is supposed to be an open cut. In estimating that the cost of the work would be one hundred thousand dollars, I have a general system in my mind, and that system would provide for one big main tunnel that would
308 run through the land and be so built as to receive water itself. From that tunnel I would run filtration galleries. I could not tell just how many to obtain that supply; it would depend on what I wanted to do with it. I figured roughly that such a tunnel would cost $12 a running foot.

Redirect examination:

From my observations and experiences, the amount of rainfall in one locality differs very considerably from the rainfall over another, not very far distant from it, from local causes, and if it were a fact established that at some particular point in the San Fernando valley the average rainfall did not exceed 11 inches, or was not as much as 17 inches, it would not change my opinion much. If it was just one spot or observed at one single place. I know, as a fact, that it is a general rule that there is greater rainfall on the higher elevations than on the lower ones. The course of the Los Angeles river in the San Fernando valley is pretty nearly due east, and

when it passes through this narrow space between the Verdugo and the Cahuenga, below the land sought to be condemned, its course is southeasterly. The San Fernando basin to the westward and northwestward of the land in controversy is of a higher altitude than the land in controversy and the land sought to be condemned, is of greater altitude than the main portion of the city of Los Angeles.

If there should be any such thing in some places in the San Fernando valley as an average rainfall less than the average in the city of Los Angeles, I should say that it was due to some local causes. It would not be in consonance with the general principle. The depth of the tunnel proposed to be constructed by the city is about 32 feet below the level of the water plane at the extreme upper end; at the lower end it comes out on a level with the river. In
309 progressing towards the head it has a pretty uniform grade. The bottom of the tunnel would be one foot to the thousand feet. In the depth that I spoke of, therefore, it would vary from nothing to 32 feet below the water level, and as a grade practically uniform.

F. C. FINKLE was called as a witness on behalf of the defendants, and testified as to his qualifications as an expert, as a civil and hydraulic engineer, and having qualified as such, testified that he had been in the employ of Pomeroy and Hooker, investigating the land in controversy since the middle of February of this year, and testified in substance with respect to the manner in which the water is moving underground in the land of Pomeroy and Hooker, and how it comes into the excavations, the altitude of the water plane above the surface of the water of the Los Angeles river and in the cuts, the cost of construction, and the amount that could be developed in the land in controversy, without affecting the flow of the Los Angeles river, substantially as the witness Newman; also as to the general topographical features of the country, the amount of the watershed, the rainfall, the proportion consumed in run-off, evaporation and plant life, and that after deducting for those causes there would be 19,995.4 inches of water measured under a four-inch pressure, as a constant flow, not including the amount flowing in the Los Angeles river which is contained in that tract of land, is on an average about 3,000 inches; and that the water, in his opinion, made its way out of the San Fernando basin by underground percolation through the San Fernando valley, and the gap lying between the Cahuenga hills and the Verdugo mountains. That of the 19,995 inches measured under a four-inch pressure, which, in his opinion, was left unaccounted for, after deducting the ordinary flow of the Los Angeles river and the storm-water run-off, the consumption by plant
310 life and evaporation, the greater portion flows through the Pomeroy and Hooker tract.

On March 12th, 1896, at the opening of the session in the afternoon of that day, and while the witness Finkle was still on the stand and testifying before the jury on the issue to be submitted to them, the court delivered its opinion upon the questions tried before the court, as follows:

The COURT: Gentlemen, I have come to a conclusion on these preliminary issues, and perhaps it would be as well for me to state what my conclusions are now, so that you may know to what extent the decision will go.

The first question to be decided is whether or not there is any authority in law to take the fee-simple in the property that is described in this action and sought to be condemned. Section 1239 of the Civil Code I think is hardly broad enough to justify a condemnation, for the purposes mentioned here, of land in fee-simple. It provides for the condemnation of the fee-simple for the purpose of a reservoir or public grounds, and some other purposes which are not pertinent to this case. It is not proposed here to use any great quantity of this land for a reservoir, and it does not appear that the other portions of it would be necessary for a reservoir. I hardly think, either, that the term "public grounds" would be considered to include ground used for the purpose which is proposed in this case. I think it rather means public parks, or grounds attached to some public building, for the purpose of access to the public and the use of the public in person. I think, however, we can look to the charter for authority to condemn property, and that the charter is not subject to the criticism that it conflicts with the general laws in that particular. The principle is that while the right of eminent domain exists, it can only be exercised in cases where it is authorized by law. Section 1239, which is a grant of power to condemn certain estates, is not an
311 exclusive grant. There is nothing in the words used which implies that no other estates can be taken for public purposes. So that anything in the charter enlarging or making an additional class of property which can be taken for public purposes would not be in conflict with section 1239. The section 2 of the charter has two subdivisions which refer to this subject: Subdivision seven provides that the city has power to provide a water supply for the city and its inhabitants; and subdivision fifteen of that section provides that it has power, also, to condemn property that is necessary or convenient for the exercise of all the powers that are granted to it. That would cover the right to condemn any property that was convenient or necessary for the purpose of providing a water supply for the city. In addition to that, the act of 1891, page 102 of the Statutes of 1891, is a very broad provision to the effect that any incorporated city may condemn all property and appliances which are suitable and proper for the purpose of providing water for the city and its inhabitants. Taking these sections, which are very much broader than section 1239 of the Code of Civil Procedure, I think there is no question but what the city has the power to take the fee-simple for the purposes mentioned in this suit.

The next question is whether or not it is necessary to take this property for the purposes mentioned. The necessity that is intended by that word I think it not an absolute necessity; that is, it is not something that must be absolutely indispensable. And neither is it a necessity which must be closely examined and very closely hedged, especially in matters of this kind where it

is a provision for the future, and which can only be determined, to some extent at least, by conjecture. It is a r-asonable necessity in view of all the circumstances of the case and the probable future conditions. I think the city would be entitled to
312 do the same things to provide for this necessity, or to provide for this water supply, that any private person in the exercise of good judgment would do under like circumstances. Now, it is a matter of history, and the reports in our own courts show, that private corporations—that is, quasi-private corporations—which are organized for the purpose of supplying water to cities, have purchased large tracts of land in fee-simple, absolutely for the purpose of providing themselves with land upon which they could develop water. And it is also matter of common knowledge that all water corporations which have for their object the obtaining of a water supply buy all the water-bearing lands that they can get at a price that is satisfactory to them. I think that that is a matter to be taken into consideration. It is also proper to consider what the probable growth of the city is and how much will probably be needed for a considerable time to come. I should think that for quite a number of years that ought to be taken into consideration. I don't know that it would not be reasonable to take into consideration a number of years at least as far in advance of the present time as the time bonds may run. That, I think, is forty years under the present Constitution. Also, you must take into consideration the space that is necessary to establish the diversion works and to develop the water, and to make it the most economical and least expensive. Also the ground that would be necessary to prevent the possibility of contamination from things happening on the surface. It may be true that the ordinary process of agricultural pursuits would not seriously contaminate the water in this ground; but I think the city ought to be in the position to, at least for a considerable space around the water supply, absolutely control the situation. Otherwise it might find the water supply polluted and before it could begin legal proceedings and have the nuisance abated the people of the city
313 would be suffering from impure water. Another thing that must be looked into is that the water supply that is maintained for the city must be enough for the driest years. It wouldn't be prudent for a person obtaining a water supply for such purposes to content himself with getting enough for the wet years, because when they would need it the worst they wouldn't have it. They must get enough, at least, so that there will be an ample supply at the time of the very greatest need. Another consideration in this connection is that the city authorities have determined that this land is necessary for the purpose of providing a water supply, and that, while the courts will not allow the decision of the city council in that respect to stand, if it clearly appears that the property is not reasonably necessary, yet they will not interfere with such determination unless it clearly appears that a mistake has been made therein and that the property is in fact not necessary for the purpose proposed.

Taking all these things into consideration, I don't think that the property sought to be condemned here is unreasonably large.

The other question submitted to the court was the interest of the city and of the defendants, respectively, in the waters of the river. Upon this question, I will follow the decisions in the Vernon Irrigation Company against the city, and in the case of Lux against Haggin. The last case, of course, is nothing but a dictum, as the point was not strictly before the court; but the case was approved, as I understand it, in the case of the Vernon Irrigation Company against the city. And following that rule, I think the city has a right to the waters of the river which is paramount to the rights of upper riparian proprietors. I don't mean to go so far in this case as to say that the city would have a right to divert the water above the land of these defendants and deprive them of
314 any use that they might make of the water going through the land, without compensation. That is a question upon which I have such doubts that I shall not announce it as a rule in this case, particularly as I don't think that portion of their rights is of such great value as to make it justifiable to take any risk on the subject. The land sought to be condemned extends down to the lower boundary of the defendant's land. The right of the city extends, however, to all the water of the stream, whether it flows on the surface or under the ground, and the rights of the defendant are subject to these rights of the city. That, however, gives the defendants a right to make whatever use of the water they can during any time when the city does not make use of it either because it does not need it or because it does not care to use it. The right of the city extends only to the extent of its needs, and the rights come together at that point; so that whatever the value of the water is to the defendants by reason of the fact that the city may not at all times need all of it is a right which they have to value in this case and which the jury must determine in arriving at their verdict.

I don't think it is, perhaps, proper for me to state at this time what my views are in regard to what does constitute a stream of water, either above or under ground. Those matters will have to be determined by instructions to the jury as they will be the persons who will have to decide where the waters of the stream end and where the waters in the ground not a part of the stream begin. According to my view that is a question of fact to be determined upon the evidence in the case.

Mr. CHAPMAN: I don't know whether it is necessary at all to enter an exception to the decision. Your honor's conclusions being embodied——

The COURT: This is only an oral announcement. I sup-
315 pose findings will have to be drawn and signed.

Mr. CHAPMAN: Yes, sir, that, I suppose, to be the proper course; and in that event of course there is no necessity for an exception.

The COURT: No sir.

The witness FISKLE then continued his testimony in behalf of the defendants, before the jury, and testified as to the value of the water developed upon the said premises, placing the value at $500 an

inch; that of the material in the said tracts sought to be condemned about one-third was water. Testified as to the velocity of the subterranean movement, substantially as the witness Newman.

The defendants also called JAMES T. TAYLOR, C. W. SANDERS and L. FRIEL, each of whom being duly sworn, testified as to their qualifications and showed that they were educated and experienced civil and hydraulic engineers, and testified concerning the amount of rainfall of the watershed, the area of watershed, the amount of subterranean waters flowing through the tract of land in controversy, the amount that could be developed on the tract of land without diminishing the flow of the Los Angeles river, the value of the water so developed, and the cost of developing the same, the character of the water tending to show that the same was percolating through the soil, substantially in the same manner as the witness Newman and the witness Finkle, except that the witness Sanders testified that in his opinion there could be from two thousand to three thousand inches developed upon the land in controversy without affecting the flow of the river.

Defendants also called as a witness JOSEPH LIPPINCOTT, who being duly sworn testified as follows:

I reside in the Antelope valley, but have an office in Los Angeles. By occupation am a civil engineer. Have been engaged for five or six years past in various lines of work usual in connection
316 with hydraulic undertakings. Have been in the employ of the United States Government in my professional capacity. Held a commission under the Secretary of the Interior in the Geological Survey until two years and a half ago, when I resigned from the Geological Survey, and during the last year and a half have been retained by the Geological Surv-y to make measurements of the streams in the State of California, and in that capacity I devote from one-half to two-thirds of my time. Have made a study of southern California with relation to the amount of rainfall. Was originally employed in the topographical department of the Geological Survey. At present am employed in the hydrographic branch of the Geological Survey. Have made a study of the conditions in the vicinity of Los Angeles, and in this San Fernando basin, and the surrounding country generally. Have endeavored to become informed as to the amount of rainfall at various places in this section of the country. Am acquainted with the reports of the Weather Bureau. From all the information in my possession, and according to my computation, the average rainfall on the watershed of the San Fernando basin, taking the entire basin, both mountains and plain, I would consider as being at least 24 inches. The manner in which I reached that conclusion was this: The rainfall in California increases as the elevation increases on the side of mountain slopes, both of the Coast range and of the Sierra Nevadas, on the side that is next to the sea. The increase has been found to be very uniform on that slope with the increase of elevation. This has been determined by observation at a large number of points to be at the rate of six-tenths of an inch of rain for each 100

feet rise in elevation. I am acquainted with the elevation now in this watershed, and making this computation as to the annual average rainfall, my method was this: I consid-
317 ered the basin of the Los Angeles river above the point which might be called the Narrows, as divided into three classes. The mountainous class, that which is very rough and quite high, being the extreme or northwestern portion of the basin. The general elevation of the peaks and ridge that bounds that basin I accept as 6,000 feet. And from the study of such data as I have in hand I considered that the elevation, the main elevation, of that portion of this basin was 2,700 feet. I applied the increase, which is constant, as I have described it, and obtained an average increased rainfall above that which has been observed at Los Angeles. I arrived at the average rainfall for that portion of the basin of 33.76 inches, practically 34 inches; I considered it as 34 inches. That portion of the basin is 170 square miles. The second portion of the basin which I considered as second-class mountainous area, are the foot-hills of the Cahuenga mountains, of the Santa Sussana mountains, of the San Fernando mountains. And in the same method I arrived at a rainfall of 23 inches for that portion of the basin. I considered that as containing 127 square miles. The next section of the valley which I considered was the San Fernando plain proper, which I considered as being 182 square miles of area; and where I accepted the rainfall of 15 inches as the minimum, and average for the whole district would be practically 24 inches. That average is arrived at by giving due weight to the areas of the various districts under consideration, as well as to their rainfall. The experiments and observations made have shown the ratio of increase in the elevation to be six-tenths of an inch of rain for each 100 feet of rise in elevation. That is the increase. There is an elevation beyond which the rainfall ceases to increase. It is not very well defined in this section of the country, but the probabilities are that it is in the neighborhood of six or seven thousand feet. The principle of which I speak is subject to
318 variations from local causes. The measurements of rainfall are always accompanied with more or less error, due to local wind currents, which may interfere with the falling rain, or due to the character of the gauge on which the observation is made, but the principal interference seems to be that of interposing ranges of mountains. The saturated winds of this southern coast, locally and apparently, the rain storms come from the south, but actually the moist clouds which carry the rains have to and do come from the ocean, and they approach the shore from the southwesterly direction. The cause of the precipitation of the moisture from these saturated clouds is supposed to be caused by the chilling of the cloud. As the cloud is forced to raise in elevation the temperature decreasing with the elevation, and the effect of that decreasing temperature is to produce the point of saturation of the cloud. An illustration of the manner in which local conditions may affect the rainfall would be the effect of the Cahuenga range upon the rainfall in the San Fernando valley proper. The cloud is partially chilled,

and moisture condensed, in going up the southern and western slopes of the Cahuenga mountains. And after passing the summit the descent is made. And the tendency is to extract less moisture from the cloud due to the possible rising in the temperature of the cloud. As they pass on to the northeasterly, or the easterly, and encounter the higher elevations on the other side, you would still further chill the cloud. These facts of which I have been speaking have been observed in southern California to actually take place. Those observations have been made at elevations back of San Diego, ranging from the sea level of San Diego to the elevation of Julian, which is in the neighborhood of 5,000 feet. They have also been made at Los Angeles, considered as a base with reference to the rainfall at Bear valley and the Arrowhead. They have also been
319 made in Ventura with reference to Ventura as a base station as compared with the rainfall at Nordhoff and at points in the district known as the Ventura highlands. But they have been more particularly observed in the line of the Southern Pacific Railroad stations that lie between Sacramento and Nevada.

Q. So far as these observations have gone, do the facts observed correspond with the theory?

A. I don't think you can correctly call it a theory; it is a fact that has been deducted from observation.

Q. Well, I should have said the rule, instead of the theory; and where there are any variations from it, do the local conditions, so far as you are advised, account for them?

A. They do in all cases with which I am acquainted. Where there is a variation from the results as computed by the rule, and the observed fact, I think that the rule may be considered as conservative in that there are numerous instances where the rainfall which is obtained by the application of this rule is below the measured rainfall.

Cross-examination:

I have said that the moisture-bearing winds and the clouds come frequently from the ocean here, and usually do. I cannot say that they always do. In coming from the ocean, passing over the San Fernando valley, the first obstruction they meet is the Cahuenga mountains.

In answer to a question by the court, the witness said: I think that the winds that bear the moisture for southern California come from the ocean. I think probably in the city of Los Angeles and this immediate vicinity that they do not come with absolute directness from the ocean to this vicinity. They swerve in their direction, before they get here, and come from another direction when they get right here actually upon us. I
320 think that the saturated winds frequently come in this immediate locality from the south and southeast and east. I don't think it is absolutely true that the prevailing saturated winds which cross over the San Fernando watershed are from the southeast, south and east. I don't really consider myself able to say that the winds which furnish the rain to the city of Los Angeles almost without

exception come from the southeast and east, or possibly from the south, but I know this (that the Signal Service considers the rain-bearing winds of southern California as approaching from the southwest from the ocean. I have read the statement of the Signal Service, and that is the fact. I don't know that it is a fact that before we have a rain we have a wind from the east, nor that that wind continues from the east until the rain stops. I have lived here in southern California about three years. The wind frequently, according to my observations, blows from the south here when the rain is actually falling in the streets, and that is generally so. I could not say whether it sometimes comes directly from the east. I have been in the mountains of Ventura, but not in the mountains of Los Angeles. If the saturated winds came from the immediate south, the first obstruction they would meet would be the Cahuenga range, and in another portion of the basin they would be met with the crest of the Sierra Madres. The saturated winds would strike some mountains before they ever got on to this watershed at all, and when they strike those mountains they would raise and chill and some portion of the rain would be lost, and would not be recovered by them again. They would cross the San Fernando valley with less moisture than they started and the rain would be precipitated as they strike different and higher mountains. I am not sure as to exactly what the altitude of the mountains on the south side of this valley and nearest the city of Los Angeles is. I
321 think it is somewhat over a thousand feet. Winds from the southeast and east would strike those mountains before coming into the watershed and discharge a portion of their contents. I have not figured that portion of the watershed which comes out through the Verdugo mountains as part of the watershed of this basin. The Verdugo cañon would get the benefit of the rainfall from the highest mountains of the Verdugo basin. They are not the highest mountains in this watershed. The San Gabriel peak proper is the highest peak in that locality, but the Gleason peak is higher than the peaks of the Verdugo range. If the winds came from the southeast they would strike mountains, which are pretty nearly as high, and much higher than the average of the mountain-shed, and a great portion of the moisture of the winds be discharged. The rainfall in the San Fernando basin has only been measured at one or two points. It has only been measured in the basin proper at one point that I at present have a record of. I have got that record as given by the Signal Service report from the year 1877 to the year 1889 inclusive, as 16.43 inches—the average. That report is taken from a letter to the Secretary of War by Lieutenant Glassford, who was stationed at San Francisco. He got his reports from the Southern Pacific railroad. They kept a rain gauge at San Fernando. The weather bureau of this city I know have this same book that I have spoken of—the report of Lieutenant Glassford to the Secretary of War. I have got the record for each year by itself.

In 1887 the rainfall was 14.10 inches, as given in that report at San Fernando, and in the city of Los Angeles for the same year it is given as 16.27 inches. For the year 1888 at San Fernando is given

as 18.11; at Los Angeles, 21.04. In 1889, at San Fernando, 33.21; at Los Angeles, 33.31. In each of these years the rainfall at Los Angeles was appreciably more than at San Fernando, while
322 the latter is 800 feet higher than the city of Los Angeles. In that case my rule regarding the altitude would not apply, and the reason of it is because the clouds from the ocean or the southwest strike intervening mountain ranges and lose their moisture, and before they strike the watershed have lost some of it. The station of San Fernando is on the northern part of the basin, and on the higher portion of the valley. And according to the rule which I have given, should receive an additional amount of water than Los Angeles. I arrived at the elevation of the mountains by accepting the figures on the map that was prepared for the Secretary of War by Lieutenant Wheeler in 1879.

Redirect examination:

I think the rainfall at San Fernando is less than at Los Angeles, probably owing to the fact that a portion of the moisture has been condensed by the Cahuenga mountains. Another cause is that the air in the San Fernando basin is probably a little warmer, and tends to warm the air current and therefore increases its capacity to hold water. The interposition of one mountain range condenses the water to some extent, and then as it passes over the valley the temperature rises. I think that is the condition which occurs. When the clouds reach the city of Los Angeles they have lost less moisture than when they have reached the mountain peaks to the north of here, yet the greater precipitation of moisture is at the higher elevations. I got the information in regard to the rainfall at San Fernando from the book which is the latest standard authority on that subject. I am not absolutely certain that it came from the Southern Pacific railroad's gauge, but I presume that that is the case. The kind of gauge the Southern Pacific Railroad Company use at their station is a gauge with a three-inch catchment cup. The Signal
323 Service or Weather Bureau in Los Angeles has a gauge with a catchment cup whose diameter is eight inches. That is the standard gauge. Have never made personal investigations, but standard authorities state that there is a difference in the catchment of the two sizes of gauges. They are affected by the velocity of the wind and the smaller gauge catches a smaller percentage of rain, and will show less rainfall.

The higher the velocity of the wind the greater the difference between the catchment and the less rain the small gauge will measure.

Q. Mr. Lippincott, from your own observation and through your own connection with that Geological Survey are you able to state whether or not the rains of any consequence in Los Angeles, any storms that persist for any length of time, it is a general rule that we are informed by telegraph from San Francisco that the rain has fallen there, from one to two days before it commences to fall here?

An objection was here interposed by the counsel for the plaintiff, and the court said: I think the court will take judicial notice of that, Mr. Chapman. I am quite sure everybody in the court-room knows it to be a fact, and I don't know why the court ought not to know it.

Mr. CHAPMAN: I think it is a part of the universal fact. Of course, these propositions are all subject to variations from causes that are not persistent or governing us generally.

The COURT: There are exceptions to it, but that is the rule.

Defendants also called FRED W. WOOD as a witness, who, being duly sworn, testified that he was a civil engineer by profession; that he had been engaged in many occupations in this section of the country, and lived in Los Angeles for 22 years. Knew where the Pomeroy and Hooker tract is, and is acquainted with the
324 values of water in this section, and that if there could be developed on this land anywhere from five hundred to three thousand inches of water measured under a four-inch pressure, at such an altitude that it could cover the greater part of the city of Los Angeles, and the greater portion of the Cahuenga country and the agricultural country off to the east of Los Angeles city, it would be a conservative estimate to say that it is worth $500 to $750 an inch.

Defendants also called many witnesses who testified concerning the value of the tract of land, independently of the water that might be developed in it, and whose evidence tended to prove the value of the said property, independently of the water, all the way from $20,000 to $35,000, and the damage to the land not taken, from two to four thousand dollars, independently of any question of water rights; and the defendants having rested their case before the jury, the plaintiff, on March 20th, 1896, began the introduction of testimony on the part of the plaintiff before the jury, and the first witness called by the plaintiff was C. S. COMPTON, who testified as follows:

Am city engineer of the city. This map, referring to a map, was made under my direction and is entitled "Map showing drainage area of the Los Angeles river above the south boundary of the city of Los Angeles." It purports to show the drainage area of the watershed. The portion enclosed in red lines and marked "Big Tejunga creek, 134.17 square miles," is the mountain watershed of the Big Tejunga. The same of the Little Tejunga creek, and of the Pacoima. The other portion enclosed in red lines is the San Fernando basin or valley. The part marked "Verdugo creek, 33.37 square miles," does not affect the water flow under the land in controversy, and the same may be said of the Arroyo Seco, as shown on the map. The total of the watershed is 458.7 square miles. That is the area above the land sought to be
325 condemned, and does not include the Verdugo nor Arroyo Seco, nor that portion of the valley below the lands proposed to be condemned. It is compiled from the report of

William Ham Hall, State engineer in 1888; the total area of drainage basin above headworks. The small circles occurring at many places on the map in which are the letters "Elev." followed by figures, designate the elevations above the sea level in feet at the point where they are marked on the map. The point on the map marked "Proposed headworks" is the land sought to be condemned. Burbank is the town of Burbank. The red lines are boundary lines of the different watersheds, the name of which is set forth within the lines. The city of Los Angeles is the square located upon the map in the southeast corner and marked City of Los Angeles. That portion of the map marked San Fernando valley, the figures 132.88, foot-hill land, means that there are that many square miles of foothill land. 132.41 valley is that many square miles in the valley and within the sheds. The balance not designated upon the map is mountain. The map is here introduced and marked Plaintiff's Exhibit 13, and is hereby referred to as a part of this bill of exceptions.

The map marked "Map of land sought to be condemned for the proposed headworks of the city of Los Angeles water supply, showing the tunnels, filtration galleries, wells, etc., topographical and hydrographic contour on the land adjoining," was made under my direction. The boundaries of the land sought to be condemned are designated on that map by the red borders and was compiled from surveys made upon the ground by my department and under my direction. The block numbers are the block numbers of the subdivision of the Rancho Providencia and of the Scott tract, taken from recorded maps.

The lands sought to be condemned is taken from the description
326 in the papers in this action, and actually surveyed upon the ground under me. The red lines with dots occurring in them, and marked sections 1, 2, 3, etc., to 8, are lines indicating the location of well-borings made by the defendants in this case. The line through the land running nearly straight, and marked "Main tunnel line," is the proposed main tunnel of the city water supply. The lines running from it and marked "Filtration gallery No. 1, No. 2, No. 3, and No. 4," are the filtration galleries from that tunnel. The line with black dots in it every little way and at the bottom marked near the letter "C" and near the figure "8" at the top, the figures "526," the large black dots show the location of the wells bored by the city under my direction, and the small black dots the well bored by the defendants. The line which is marked black line 8, next west of the line last described, indicates well bored by the city, and the large black dots on this map on all these parallel lines indicate wells bored by the city. At the southwest corner at the red lines with small dots in them, marked sections A, B, C, D and E, indicate the location of wells bored by the defendants on this land. The dotted line running from the point D, in the northwest portion on the map on the south line of Vurdugo avenue and in a southeasterly direction to the tunnel line, at the point marked "C," shows the location of a cross-section or profile map down that line. The line beginning with the letter "B" in the northwest portion of the map and running diagonally down to the letter

"A" on the main tunnel line indicates another cross-section. The blue line running through the tract is the Los Angeles river, and is marked "Los Angeles river." The line in the southeast portion of the map, crossing the wells, and marked "Pomeroy and Hooker lower ditch," *and* is the lower ditch of Pomeroy and Hooker, which has been testified
327 to here so frequently; and on the other end of the map a line marked "Pomeroy and Hooker upper ditch," is the other cut spoken of. At the various places upon the map where small circles occur and near them "P & H well," show the location of the wells bored by the defendants. Deep wells. And the figure indicates the number of the wells as I remember them. The square in this map in brown or yellow lines, and taking up a large portion of the western portion of the tract is a tract called "Cahuenga," and is inside of the Providencia rancho. In the eastern portion the dotted or shaded space enclosed in brown lines running through blocks 49, 48, 52 and 69 and a portion of 77, is a portion of the sand warsh. The hachures in the western portion indicate a change in the elevation of abrupt change; a sort of bluff. The places marked "weirs" and numbered, are weirs placed for the measurement of the water. In each place where there is a dam marked on the map there is a dam at that place. The names of all these places indicate the nature of the object. The northern line of the land sought to be condemned, is the northern line of the Providencia Park tract, and southern line of the subdivision of the Rancho Providencia and Scott tract. The scale of feet marked on the map is correct. The scale is one hundred feet to an inch. The brown figures on the map indicate surface elevations above sea level. The blue lines represent the slope of the plane of saturation, and they are at distances of two feet difference in elevation. As you go down each one is two feet nearer sea level than the one next above it, and follow the surface of the plane of saturation. The map was filed in evidence and marked "Plaintiff's Exhibit 14," and is hereby referred to and made a part of these exceptions.

328 Cross-examination:

The wells bored under my supervision upon this land were bored mostly during the month of February, 1896. I could not give the exact date without making reference to the time I put the men at work. We commenced our investigations in the first of December, 1895. We bored forty or forty-five wells under my supervision. We had three different outfits of well-borers. I cannot recall their names at present. Do not remember any of them. I was with them off and on.

Q. What did you do with the holes that you bored?

A. We pulled the casing and used the same for the next well, to save expense. You can't tell anything about them now by observation. I presume the wells are destroyed. We can locate where they were bored. We pulled the casings to save expense. Didn't have any other object. After we bored the wells we commenced

pulling the casing immediately after the completion of the well. I only had the wells under my observation for probably half an hour or an hour at a time, and probably not over twice on any single well, and at an interval of a day, and then the casing would be pulled up, and after that further observations in that well could not be made.

FRED EATON was called on behalf of the plaintiff, duly sworn and testified as follows:

Am a civil engineer. Been practicing the profession for twenty years. Lived in Los Angeles city ever since I was born. Am forty years old. Familiar with the Los Angeles river since 1871. Was in the employ of the water company commencing about the latter end of the year 1871, and remained with them twelve years. During that time had occasion to be on the river more or less. Then I was an apprentice, and subsequently was superintendent and
329 engineer of the Los Angeles Water Company for about seven years. Was on the river a great deal. Not in the vicinity of the land in controversy, but I used to go up there a great deal. Have been familiar with the summer flow of the Los Angeles river during all that time. There is no material difference from year to year in the normal flow of the Los Angeles river, neither during the year. There is a slight variation, but it is not material. Have observed the river after what is known as a dry year, and the dry year doesn't have an appreciable *affect* upon the surface flow of the Los Angeles river. That indicates to my mind that the supply of the river is from a source that is yielding of a very uniform flow. The thing that regulates the flow of the Los Angeles river is a deposit of gravel in the valley, that the river is supplied from, and if that gravel was of a very large capacity the excessive rains would fill it up, and it would necessarily make a variable flow in the normal flow in the stream. After a wet winter the flow would be greater. I know the watershed from which the Los Angeles river takes its source of supply. The area of that watershed is about 480 square miles. It lies about the tract in controversy. It is estimated a little differently, twenty or thirty miles different one way or the other. The greatest number, I believe, is 488 square miles, and the lowest about 450 or 460. The map introduced here made from the report of the State engineer estimated it at, I think, 459 miles.

I have some observations of the rainfall in that watershed. Have the rainfalls taken in the valley of the San Fernando ranch, and the Van Nuys ranch and at Newhall. Have informed myself as far as possible, as to the rainfall. Have prepared the information and tabulated it, and have got the data here. Some of it was compiled from the Signal Service, some obtained from the Southern
330 Pacific railroad, some from Mr. Van Nuys, who has kept the record from 1880, and this I have was compiled by the city engineer, this table that I have. It contains a record from all sources that I know of. The records from San Fernando, Los Angeles, Newhall, Ravenna, San Fernando and Van Nuys' home ranch.

The first year's rainfall in Los Angeles that I have been able to get is 1880. That was 18.6 inches. In the same year at Van Nuys' it was 11.46; San Fernando, 12.63; Newhall, 13.30; Ravenna, 7.94.

In 1881, Los Angeles, 5.60; Newhall, 8.23; Ravenna, 3.36; San Fernando, 5.30; Van Nuys' home place, 3.45. This is the lowest rainfall of which any record has ever been kept. The lowest this list shows that occurred from 1880 to 1894.

In 1882 there was 7 inches at Los Angeles; Newhall, 9.79; Ravenna, 7.48; San Fernando, 8.15; Van Nuys' home ranch, 9.04. In 1883, 14.20 at Los Angeles; 13.76 at Newhall; 6.79 at Ravenna; 11.50 at San Fernando, and 13.25 at Van Nuys'.

In 1884 at Los Angeles, 40.50; at Newhall, 44.20; at Ravenna, 28.09; at San Fernando, 27.02; at Van Nuys', 33.62. That is the greatest year's rainfall at Los Angeles, but not at San Fernando. The greatest rainfall occurred at San Fernando in 1889, 33.21 inches.

In 1885 at Los Angeles, 10.60; at Newhall, 13.63; at Ravenna 7.70; at San Fernando, 11.70; Van Nuys', 15.54.

In 1886 Los Angeles, 17.20; Newhall, 14.37; Ravenna, 14.02; San Fernando, 15.53; Van Nuys', 14.23.

In 1887: Los Angeles, 16.40; Newhall, 21.01; Ravenna, 14.38; San Fernando, 14.10; Van Nuys' home ranch, 21.09.

In 1888: Los Angeles, 20.90; Newhall, 22.18; Ravenna, 12.58; San Fernando, 18.11; Van Nuys', 16.94.

331 In 1889: Los Angeles, 33.30; Newhall, 34.07; Ravenna, 21.71; San Fernando, 33.21; Van Nuys', 30.02.

In 1890: Los Angeles, 12.60; Newhall, 14.10; Ravenna, 8.8; San Fernando, 10.90; Van Nuys' home place, 7.64.

In 1891: Los Angeles, 12.90; Newhall, 15.35; Ravenna, 8.96; San Fernando, 10.94; Van Nuys', 9.54.

In 1892: Los Angeles, 18.72; Newhall, 19.73; Ravenna, 8.45; San Fernando, 13.92; Van Nuys', 14.20.

In 1893: Los Angeles, 21.90; Newhall, 18.48; Ravenna, 11.59; San Fernando, 16.75; Van Nuys', 15.21.

In 1894: Los Angeles, 7.51; Newhall, 10.96; Ravenna, 8.15; San Fernando, 8.35; Van Nuys', 7.40.

From these figures I make the average during all that time for Los Angeles, 17.44; Newhall, 18.21; Ravenna, 11.28; San Fernando, 15.21; Van Nuys', 14.85.

Ravenna is further up in the mountains and over on the north side of the watershed. It is outside of this shed. It is higher than any of these other points; 2,300 feet in round numbers. Over 1,000 feet higher than any other point on the list; 1,300 feet higher than San Fernando. The elevation of San Fernando is 1,065; at Van Nuys', 770; at Newhall, 1,268. Ravenna is so situated as to be protected from the saturated wind currents. The saturated air is pretty well absorbed by the time it reaches Ravenna, and that, we think, is one of the principal causes of the rainfall being lower there than at any of the other places. In estimating this watershed I have divided it into three classes,

mountain shed, foot-hill shed and valley shed. I took the same classification that Mr. Lippincott did, and used about the same area. I made my estimate on 179 square miles mountain shed, 127 foot-hill shed and 182 miles of valley; and I find in that 182 miles of valley I included a little piece of valley down below
332 this point. But my estimate practically eliminates any yield of rainfall from that valley, I have taken the average of the valley watershed at 15 inches of average rainfall per annum. That is about the mean of what falls at San Fernando and Van Nuys' and is about the same estimate that Mr. Lippincott made. I placed on the foot-hill portion an average of 18 inches per annum. I took his rule for figures of rainfall for elevation, which I find from other rules laid down for regulating that increase which corresponds very nearly with the rule of Mr. Lippincott, .6 for each 100 feet of rise. Only I started my basis from the rainfall in that valley. He started his basis from the Los Angeles rainfall, which makes considerable difference. I assumed that the proper basis is from the gauges that we have in the immediate vicinity. Of that 15 inches of rainfall in the valley watershed, those valley sheds with that rainfall can't yield any quantity of water for purposes of development like those proposed. It is practically nothing. I have made it a small quantity, 160 inches. That 15 inches that falls upon the valley portion is most always absorbed by evaporation and vegetation. That is true in all cases on an ordinary plain. You never can figure on any yield from a shed of that kind. The plant life and evaporation will take up that amount of water. I don't consider the valley portion as available for furnishing water for the purpose of development; that is, not the rainfall that falls on the valley itself. The water which flows under ground at the land sought to be condemned, in my opinion, is the surface waters that run off of these mountains and drain into that valley. There is the Pacoima, the Little Tejunga and the Big Tejunga, and then these foot-hills around the valley, that is a considerable area there. They, of course, don't yield as much as the other mountains, because they are not as high. The only accounts allow an eighteen-inch rainfall
333 for that portion of the mountains—we call them foot-hills. The foot-hill area I estimated at 127 square miles. I didn't follow Mr. Lippincott's figures in estimating the mountain, for the reason that he starts from Los Angeles. Los Angeles is about 250 or 300 feet above sea level, and the average elevation which he assumes to take for that mountain shed is 2,200 feet, which I accept also. That would—applying six-tenths to that—we will say 300 here from 2,700 would be 24, and six-tenths of that would be about 17 inches, which, added to the 17 here would make it thirty-four, whilst you have got to commence from a basis that's 1,000 elevation at San Fernando. Commencing from that point and increasing you would only have an increase on 1,700 feet. In order to calculate that mountain basin there, I take Newhall and San Fernando and the other, Van Nuys', and I take an average of them, and call it 17 inches. Six-tenths on 1,700 feet would make it 27 inches, for the whole mountain. I didn't take into consideration any cause which

makes low rainfall at Ravenna might have on this rainshed. I take this as a basis to calculate the run-off from that shed. The waters which supply the Los Angeles river leave this main part of this watershed on the north and west and take a southerly direction until they strike this land that we propose to condemn, and then they take an easterly direction, running easterly through the land. As they discharge from the cañon they discharge in a westerly direction, and just as soon as they get out of the cañon they deflect suddenly and turn to the south. The stretch across west is practically of level land, and the course of inclination is toward the south, and it is very considerable, and it is quite natural that these waters should take the greatest inclination, which follows these washes laid down on this map. The natural grade of the land takes it directly
toward the land sought to be condemned, after leaving the
334 cañon. This watershed yields to the normal flow of the river,
according to my estimate, 6,993 inches. Took it from Mr. Lippincott's rainfall, which is in excess. The rainfall which I assume to be the correct one, gives a rainfall of 4,638 inches, measured under a four-inch pressure, which would represent the normal flow of the river, under ground, and on the surface, running 365 days in the year. That includes the surface and underflow of the river. I think that amount fully, and a little more than, covers it.

Q. How much of that is flowing on the surface in the time of normal flow?

A. About 2,500 inches by actual measurement, and that would leave a total water flowing under ground, in my opinion, 2,138 inches, and it is my opinion that 2,100 inches will cover all the water which is flowing under the ground, and discharging itself out through this neck and down to the Los Angeles river. In making my figures I took the actual figures in the Arrowhead shed, that is the run-off, and then I took the usual method which I have employed in making these calculations roughly, and which is a third loss, one-third evaporated and a third storm water. I found that it plotted—that is, the mean—the mean of—between those was what had been observed from the run-offs by the geological surveys of the arid district, and from that there's a curve plotted called the Newell curve. I found that was about a mean between the two and as the Arrowhead was somewhat similar to this shed, I accepted that as a basis to figure from. Now, we find from experiments made in this state of run-offs, and actual measurements of run-off, that there is about seventy-five to ninety per cent. of this run-off carries at an abnormal flow; that is, of the balance, would represent the normal flow of the stream, and as the normal flow is the only thing you can depend
upon as supplying the Los Angeles river, there being no
335 storage facilities that we can avail of, that represents the capacity of that river, and you have to take that as the flow of that river, normal flow, and yield from this shed. By abnormal flow I mean the flow at times of a storm. The storm water that runs away. There is no reservoir sites to catch it; and it is lost, and is of no value to any one, except the lower lands between here and San Pedro, where it sinks and makes damp places.

By the normal flow I mean that which flows in the summer flow; the whole year; the regular flow of the river outside of the time of storm. I don't apply this 75 or 90 per cent. of the run-off, because there is some gravel beds between the discharge from this mountain shed and the river, by which we intercept considerable of this storm water and hold it back and let it off by degrees. That is what regulates the uniform flow of the river. I have allowed 25 per cent. of this on account of that as being absorbed by that bed between the discharge point from the mountains and the river. These storm waters flowing from the surface of the gravel beds will, a good deal of it, be absorbed, and I have allowed about 25 per cent. as being absorbed by those beds. That is between the point where these waters are discharged from the cañon and the lands sought to be condemned, there are gravel beds which absorb a great portion of the water and hold it and let it out gradually into the river. I allowed about 25 per cent. of that, which makes 60 per cent. of this run-off which is wasted. At this rainfall that we figure on, leaving 40 per cent. as available for the net discharge. It represents the discharge that makes up the river in its normal flow, and the only one that we can count on for any use, and that 40 per cent. of available flow on the surface and under the ground equals 4,600 and some odd miners' inches, constant flow, and of that 2,500 inches flows upon the surface and the remaining 2,100 inches under ground. I have heard the testimony of Messrs. Friel, Newman and Finkle, re-
336 garding the amount of water which flows under ground at these points and of the material under ground, which was water, and as to the percentage of the material. I know the width on the surface of the valley approximately. I don't know where the bed rock is. There has been a well bored by the defendants which found water-bearing gravel from the surface down to a depth of 123 feet. The well was bored, I understand, to about 200 feet. A cross-section of the valley at that point 123 feet deep, the depth to which they had water, I figured upon, and it took it all to carry the 19,000 inches of water that they claim was under ground. There may be water standing in there perfectly stagnant. I should say there was; that there is places in that cross-section where there isn't a movement of a foot a year, some of it. There are other places where it is running quite rapidly. All of that water which discharges itself from that watershed has to go down through the same watershed towards the Southern Pacific Railroad bridge here. It all passes through between the hills. There is no other place for the discharge. Am familiar with the cross-section of that river further down. We have made investigations recently sufficient to enable me to approximate about what the cross-section between the bed rock and the surface of the saturated plane at that point would be. There is a place down below where the neck between the mountains on either side is very much less. From the borings thus far made, we can safely say that 200,000 square feet will approximate that water. The channel at this section between the rocky mountains and the saturated plane, will be in the neighborhood of between thirty-five and thirty-seven hundred feet in width. It is less than a

mile across. That has been bored for the purpose of determining how deep it was to bed rock. I was familiar with that cross-section before.

There were borings made there several years ago. In 1879 I
337 think practically at the same place, or practically in 1877.

The borings were by the city of Los Angeles, and Mr. Kelleher was city engineer at the time. And recently in the last ten days borings have been made under the supervision of the city at this cross-section; they are not quite completed yet, but they have proceeded far enough to permit me to say that 200,000 feet would be an approximate estimate of the area of that cross-section. Four of the wells have struck bed rock. Every well that has been bored has struck bed rock. I have not been there since they struck bed rock, at three of the wells. I saw one that satisfied me that it was bed rock. I think the average depth to bed rock is 50 feet, and 4,000 feet wide, makes 200,000 square feet. I think this is a fair cross-section at that place, and I think it will turn out less than that. I observed the material from all the wells that were bored there, and there were three being bored at the time I made my investigations. The material at this lower cross-section is what I would call coarse sand, occasionally a little gravel stone or boulders, but very little of that compared with the balance, and once in a while you would find a little fine sand. I would say it was coarse sand—a coarse-sand cross-section.

I think all of the underground water of this shed must go through that cross-section, that wasn't absorbed, if any is absorbed, by the bed rock. That we don't know anything about. It is very difficult to arrive at the velocity of the water at that point. The date that we got together on water flowing through sand, if that water was flowing through uniformly there it would give a ridiculously low amount. Lower than I am satisfied is flowing through there. Now, we have an area of the river bottom on this land that we are seeking to condemn and I believe Mr. Friel testified it is something like eleven acres; and I have scaled it to make
an approximate estimate, and that's about what it figures
338 out. We have an actual measurement of the increase of the water in the river between the points including this area. There is something like an increase in the length of that land of 1,300 inches, but all of that isn't rising immediately in this bed. There is some sometimes coming in on the sides and I put it at about a thousand inches coming up out of the bed. Well, if we take that as a guide to determine about how fast the water would pass through that sand, if it is passing through uniformly—of course, it's not, because you can see the water boiling up in places along; but we would estimate that it is passing through uniformly; why, it would give us a velocity of a half—less than a half—a foot an hour. Now, that's what we get from actual measurement. Now, that is acting under more favorable conditions that would be down at this lower place, because all round this river bed the water plane is elevated, two or three, or four or five feet, and the distance from the bed rock to this elevation is—is not very much. Therefore, the pressure acting upon that bottom, which is—through which that

water is coming up, is far greater than it could possibly be if passing through a section of a grade of a foot in a hundred, or six inches in a hundred—which this lower one doesn't have that. It doesn't—probably over three or four inches in a hundred, which would represent a head acting through a hundred feet. And if the head that was acting on this was only a hundred feet from that, that would—that would be acting under eight or ten times as much head as this cross-section would have. So you see that the velocity in that lower cross-section would probably be less than that. But even that—we having five hundred and—well, eleven acres is about, say, forty-seven hundred or forty-four hundred and seventy-eight or eighty thousand feet; over twice the area of that cross-section down there that we bored. And if we take this as an index to guide us in estimating
339 what will flow through sand here, that wouldn't flow over four or five hundred inches. Well, that's ridiculously low. There is more water than that, I am certain, that's flowing there. I think there is about—well, my opinion—without anything particular to substantiate it, I would say it was—it was a half or a third of what is flowing there, and it is about a fourth of what we estimate. And the amount flowing through this cross-section would, on that basis, only be 500 inches, but I have figured that the underground flow was about 2,100 inches.

Q. Well, why do you believe 2,100 inches is flowing through that cross-section?

A. Well, I don't think that that water is coming up—certainly not coming up uniformly through there. That we can see. We can see it boiling up in places, and other places you can't. It's not possible, and that water is probably coming up under—instead of coming up out of eleven acres, it is probably coming out of a third of that, maybe. There are places where you can see nice little streams running out, and other places where you can't observe any water coming out. It is my opinion, therefore, that the water underflow through this cross-section isn't flowing uniformly. My opinion would be that in this cross-section the amount of underflow is about 1,500 inches, something like that. Of this 2,100 inches, which I testified that I believed to be flowing under the ground through the land sought to be condemned, and the land opposite to it, is accounted for in this way. The river shows an increase down at this cross-section, of about a thousand inches. Between the Hooker land and this lower cross-section. Now, I estimate that the Verdugo shed is yielding about 750 inches. The Verdugo shed comes in below the land sought to be condemned. I figure from the Verdugo there is about seventy-five miles, I think, 750 inches as the available flow from that, the water crop, and I figure that a portion of the increase in the river comes from there and the
340 balance from the underflow. There is no other source of supplying it. It's thrown up by this narrowing of the cross-section and the reduction of the grade. The underflow is passing through the Hooker land. This lower cross-section is just inside the city limits; about a mile inside. That lower cross-section re-

ceives also the discharge from the Verdugo and the land between this land and the Verdugo. Now, there are diversions from the Los Angeles river at several points, but I take them into consideration in this estimate. The first diversion is made at what we call the main supply ditch, that is on the land we are seeking to condemn. They divert about 900 inches there in the summer. They call it about 700 inches that they get away from the river there. The ditch is very leaky along there, and there's a couple of hundred inches wasted before they can get away from the river. The water company divert on the surface about five to six hundred inches, I should say. I can give the actual measurement; on the 19th of March of this year there was diverted in the main supply ditch 750 inches; in the water company's ditch 546. The surface of the diversion and the underflow was 700 inches. Near the southeastern boundary of the Hooker ranch the river was flowing 1,823 inches, making a total of 3,819 inches of water above the water company's ditch. Now, the river at the lower borings was 2,830, making an increase of 989. Then, there are two small ditches that divert water in the summer time. One called the Chavez and the other the Feliz ditch. They divert about 200 inches, the two of them. These measurements were made yesterday. They are late measurements up to date. The average diversion in the Zanja Madre ditch No. 6-1, is about 1,500 inches. And they are diverting now at the lower diversion points, which is at Macy Street bridge, about seven or eight hundred inches. They enlarged that ditch since I piped it. They put in some double pipe, so it
341 has a capacity now of 800 inches. Of course, when that diversion is made out of there, there is no water flowing down on the surface. Altogether there is about 800 cubic feet a second, or 4,000 inches that is flowing down. That includes everything that is taken out and everything that is taken from all its sources. Includes the so-called Arroyo Seco watershed, the Verdugo watershed, and includes all the water taken out into the of city Los Angeles, down to the Macy Street bridge. Now, when there is less diversion being made from that, there is water passing below Aliso street, and also there is diversions taken out by the Ames ditch and flows down below the city. When these diversions that I speak of are in operation, there is no water comes down there to that extent that I state. There is no water runs down there. I don't know how much of the underground water would be collected by the construction of the general plan of these headworks proposed by the city, as set forth in Plaintiff's Exhibit 14, and tunnels and filtration galleries. There would be some underground water collected sure, because you reduce the section that the water is now passing through under ground, but you would reduce the river below that much. Whatever you take out there is necessary to maintain the surface flow below. No development can be made there, without diminishing the river below. The water that you take out under ground here would diminish the flow further down just simply by an increase of diversion at this point. All the water that is flowing under ground is necessary to make the surface flow at all points, be-

cause it is nothing but a sandy bed. The water can pass through all of it and any of it, and up and down, and if you take it from below you will move it from under the river; it's bound to drop down through the sand. We have evidence of it right on the river. If this underground system of tunnels and filtration galleries were to be constructed, and water to be taken out
342 through it, it would, in my opinion, affect the surface flow of the Los Angeles river. Of course it would. It would affect the surface flow on the land itself and below, too. Whatever affected it there, it would reduce the surface flow below. In my opinion, if this improvement the city proposes to make should increase the quantity diverted at this point a thousand inches, why there would — a thousand inches less flowing on the surface further down along the line somewhere of the river below, and if the water is taken out under ground at this point, water to the same quantity will disappear from the surface flow at some point, in my opinion.

In my opinion, there is a direct connection between the water which flows upon the surface and the water which flows under the ground, upon the land sought to be condemned. It is solid water from the surface as far as we have bored down, except where in a few places some of the pockets of clay were found. Wherever they were found, of course, they divided it, but that was only local.

Q. Well, is it, or is it not, all the same water?

A. Well, if it's solid water from the surface of the water on the ground down as far as we have gone to find water, why it must be the same water. It all comes from the same source. At one time it has all been mingled up together, at least part of it. If you drain the land dry under the surface flow, the latter would drop down to take the place of these voids that are created by the subtraction of the water below. Gravity would naturally take it down. It is this water in the sand, in the saturation, that sustains the water on the surface. I consider all the waters that are flowing on the surface and under that surface are necessary to maintain the waters of the Los Angeles river. Without the underflow you could not have a surface flow. That underflow must be sufficient to fill those voids up, or it will flow from the surface down, until those voids are filled.

343 Cross-examination:

Q. What do you mean by solid water from the surface down to the depth of the wells bored?

A. Well, water in contact.

Q. Is that the only distinction that you are prepared to give of what you mean by solid water?

A. Well, water must be solid if it is in contact. Of course, there is a lot of sand mixed with it there, to the extent possibly of two-thirds in volume.

Q. At all points?

A. No, I don't think so. I think it is quite variable. You will find some places where it don't have that proportion, and other places where it will have a greater proportion.

Q. And where do you find it in a less proportion.

A. You will find it in fine sand; you will find it in clay. Do you speak now of less proportion of voids, or less proportion of the sand and gravel.

Q. I am speaking of the proportion of water to the materials with which it is mingled, and not what I will find, but what you did find?

A. What we did find?

Q. Yes, sir.

A. Well, I should imagine that the material that we would call sand—sand there, coarse sand, would have, say, 30 or 33⅓ per cent.—30 per cent., say, of voids. The fine gravel which was free from sand would have possibly—might have as much as 40; 38 or 40. The finer sand; that is, very fine, might not have over 16—18 per cent. Maybe 22 or 23 per cent. There is quite a variance in the percentage of voids in the different character of material that has been taken out of there.

I wasn't present at the borings made on this Pomeroy and Hooker tract, but I observed the material on several wells that was taken out, after they were bored.

Q. And about what extent of country would the wells which you examined cover?

344 A. I rode all over the land where most of the wells were being bored to the north. I have been pretty near all over the Pomeroy and Hooker's land, the most of the wells were bored on the lands to the north, and I saw materials from quite a number of those wells. The space in that valley covered by these wells from east to west is about 6,600 feet, along Verdugo avenue, and about, say, a mile wide north and south. I was up there through what is called the Pirtle development, which commences somewhere near the corner of the land, and extends, I should say, northwest. The cut zigzags all over. It runs all points of the compass. The general direction would be northwest, and 3,300 or 3,400 feet. The material discovered in the various wells and cuts are not practically the same all through. In the Pirtle development cut there was lots of coarse gravel in there.

Q. Well, isn't there coarse gravel every place else that wells have been dug?

A. Some of these wells show gravel quite free from sand. I believe every one shows gravel. They all show sand, and pretty nearly all of them a little clay. The material brought to light by those excavations and wells is practically the same throughout that whole extent of country. Differing a little in the proportion of the quantity of gravel and coarse sand and fine sand and clay in different parts, but the material is practically the same. Water is found in all of those wells at about 15 or 20 feet depth below the surface. They vary. And it is found at a depth varying from 150 to 123 feet. Some of the wells are only about 30 to 40 feet below the surface, but it is very likely that the deposit of a similar character, if not the same, occurs further down. There was a well sunk by the defendants, showing water at a depth of 123 feet. I was city en-

gineer about four years. Paid a good deal of attention to the Los Angeles river then; not as much as when I did when with the
345 water company, because all my work was on the river then. There is no material variation in the Los Angeles river since I have known it in the ordinary flow.

There is once in a while probably ten per cent. or five per cent., I don't believe it would run over that. I am speaking of the normal flow the year through, winter and summer. When the floods affect this flow it is only for a short time. Above the lower cross-section. The floods affect it for a long time below the Arroyo Seco, but above the Arroyo Seco they are affected for a very short time. I have seen 5,000 inches run from the Arroyo Seco for months. I don't know but what two months, and I have seen a couple of thousand inches run down there for two or three months, and I have seen water running down there all the year round, 500 to a thousand inches. Quite a number of years. I won't say how recently. I think about 1883. But I can remember that water is running in a large volume for a good while since. I believe that the ordinary flow of the Los Angeles river at the lower end of the Hooker land is greater now than it was formerly, but the river has been cut out about six or seven feet there, and it is due to that fact. I don't know that the flow of the river in its ordinary stages in the summer season below the Hooker land and down to the city limits is greater now than it was twenty years ago. There is some waste water; there is an increase of the waste water now. There has been water flowing down past Macy street, but that was due to something which I did myself, and that was to reduce the size of the conduit in the Zanja Madre. It formerly had a capacity of 500 inches more than it has now.

Q. That is not answering my question. I am not talking about the Zanja Madre, but the Los Angeles river; whether there is more water flowing there ordinarily in the summer season now, than there was twenty years ago.

346 A. I don't believe there is very much difference—take the river as a whole, there is very much difference; but there has been an increase in the water that has passed Macy street. And I can remember a time when there was no water passed Aliso street at all, and I have observed water passing there of recent years a great deal. A person might judge from that that the river had materially increased. Possibly it might have increased two or three thousand inches. There has been a good deal of cultivation up there in the last twenty years. That might have some influence on it. I estimate the watershed at about 480 square miles, and of this 480 square miles I put in the valley portion 182 square miles. Average rainfall on that portion 15 inches. Fifteen inches rainfall per annum of that area of watershed would, if none of it were wasted, supply in round numbers 10,000 inches, measured under a four-inch pressure, flowing the year through. In my calculation I took no account of that, in estimating the underflow. I only allowed for that watershed 160 miners' inches. The rest goes to evaporation and plant growth. What part goes to evaporation and what part to plant life is a variable quantity. It depends a great deal on how the rain

alls. The rain falling mildly on this land, distributed over a great space, would be an immense amount of evaporation—an immense amount of time, I mean, the evaporation would be very great. The ground would never get a chance to become saturated.

In my calculation I have taken the run-off to amount to half an inch of rainfall. The run-off on a place like that, is caused by a sudden dash; a big shower; and I follow the same rule as I do on the mountain shed, of 40 per cent. available. Half-inch run-off would be equivalent to a sheet of water all over that half an inch deep, and there is six-tenths of that would be storm water, that you can't avail of, that would occur during the rains.

347 Q. What I want to get at is the disposition of this 10,000 inches. You have got 160 inches which you allow to increase the underground flow. That leaves us 9,840 inches on hand.

A. That ain't run-off. That has gone in plant life and evaporation. Part of it has gone in run-off, a very small portion of it. We will say an amount equal to 200 inches would be lost storm water, wasted. And the balance is lost from evaporation and plant life. I have made no calculation as to how much would go by evaporation and how much would be absorbed by plant life. If that shed was up on a mountain, with precipitous sides, I would figure it differently. There would be a yield there. There are several things that control the amount of evaporation. Temperature controls. It depends on how the rain falls. You can take 12 inches of rainfall and dash it all on the ground at once, and there would be a tremendous part of that run-off in the shape of waste storm water. Then the quantity from evaporation would not be so great. But you let it fall, as it does here, in these gradual showers, and extending over four or five, or three or four months; and it is held in the surface ground; and the winds passing over it; and the changes of temperature. This evaporation is going on all the time. The amount of evaporation depends, of course, on the amount of a shed. The surface exposed in a shed like this valley, receiving the water as it does, the evaporation and plant life would get away with that quantity of water.

Q. Let me try again before you go further, to make myself understood. I am not asking you to compare one kind of watershed with another, or one kind of a waterplane with another. Whether it be standing in a basin or cistern, or a reservoir, or on a flat plain, or coming down a mountain side, or whatever else it may be, what is the percentage of evaporation determined by? Is it the surface exposed or the quantity of water?

A. It is both the surface exposed and also the quantity of
348 water; and other conditions. Don't confine me down to those things. If you had one basin of water standing here, that was four feet deep, and full of water, and a foot across it; and another one that was 1 foot deep and ten feet across it, and they are exposed to the same conditions; if one had ten times the amount of area of the other, there would be ten times the volume lost in that as there would in the other. And the fact that one was ten feet deep and the other one one foot deep, would either have no effect,

or appreciably no effect. If you had that water exposed a long time, in a torrid sun, it would make a difference. The one ten feet deep would not evaporate as fast, because the water would not heat up as hot. The shallow one would heat up hotter and therefore evaporation would be greater. But this is not subject to those kind of conditions. My final conclusion is that the extent of the area of surface does have a considerable effect upon the amount of evaporation. The portion of the watershed which I am including in this valley part, is the San Fernando valley. That is the portion that has the greatest amount of plant life to support. The western portion of it has the greatest, or the center and the southwestern. The whole amount of lands that you include in the valley watershed is precisely that part of it where there is the greatest amount of plan- life to be supported, of any other area in this whole watershed, and the water that is consumed in that plant life is necessary to support its life. If it were not supported by the water it would die.

Q. Now then, if this water that fell upon the surface of this plain in this valley did not fall there and be consumed, in part, in supporting the plant life, it would have to be supported, if supported at all, by the waters which came down from the mountain shed, wouldn't it?

A. A very small part of it would get over in that valley. It would run off to the river. The main channel leading from all
349 the upper watersheds to the river are collecting the water for all of this whole sheds. The Los Angeles river runs on the southern side of this range. The greatest amount of rainfall is up in these mountains and it comes down in a southerly direction across that towards the Los Angeles river and I allow 25 per cent. soakage in each of the channels from where they discharge on the plain. In the river.

Q. Now, if this water coming down from the mountain would not come into that valley and support plant life, why don't that that falls onto the valley go into the river?

A. Well, this would soak down into that ground there and find its way under some of this land. I don't think there is a very large percentage of it by any means. Because I don't think the tendency of the water passing down through soil in a westerly direction, and it follows pretty generally, of course, those washes. And the main body of the water which is flowing into that river through these channels—some of the channels lying under ground here are pretty close to the surface.

Q. Why don't you think the waters come down?

A. Oh, there is some water. If this water is collected pretty fast —this area here is of a coarse texture. It is a kind of clay; heavy soil. And it is collected into these drains and carried off rapidly to the river. Part of it runs southerly and part of it southeasterly, and part of it easterly and part of it northerly. The lowest part of the valley we are considering is the eastern boundary of the Pomeroy and Hooker land. The water slopes to the southerly or southwest-

erly. From the Cahuenga range the general course of the water is toward the southerly end of the Pomeroy and Hooker tract.

Q. What, in your opinion, makes the water rise up in the bottom of that river?

A. It is the Cahuenga mountain. They form an obstruction
350 to this flow. Otherwise it would flow on through down through the Los Angeles valley. There may be places there where small quantities pass. And the reason it doesn't continue in a easterly direction is that near the eastern boundary of the Pomeroy and Hooker land the mountains commence to trend in a southerly direction, making about a right-angle bend at that point.

Q. I asked you why it didn't flow off to the east there, instead of rising up in the bottom of that river.

A. Well, it bubbles up and makes a surface stream there, and then flows off in a easterly direction for a ways, and then turns southerly. The reason that it don't flow off in that direction before it bubbled up was these mountains intercept and prevent it from going. Of course it is a resistance that it meets with that makes it come up. It meets a mountain there and that forms a resistance. If it could make its way off to the east easier than to come bubbling up to the surface, it would do it. It would come up where the least resistance is offered. It comes up underneath there, because it is easier to lift the water up through the pressure which is present there by that range of mountains, that it is for it to flow off down the other way until it reaches a certain height.

Q. This range of mountains operating as a dam on the south lifts these waters up just so long as the resistance the waters meet with in their eastern course is greater than the pressure that is required to lift them up towards the surface, and when the water plane reaches a stage where it cannot be lifted any easier than to go off to the east, they go off to the east.

A. I will have to ask you to ask that question intelligibly. I don't exactly understand what you mean by lifting that water plane.

Q. Well, you do know the water moving south meets with the Cahuenga range there?

A. Yes sir.

351 Q. It operates as a kind of dam, doesn't it?

A. Yes sir.

Q. The water rises behind it just as it would behind any other dam?

A. At this point.

Q. And that makes the water plane. And when that water plane has reached a height where it can make its way off in some other direction easier than it can be lifted any further, it will go?

A. Yes sir, it will always go where——

Q. That is a fact. It don't make any difference whether it is under the surface or above?

A. Yes sir. On the surface or underneath, it would go where there is the least resistance.

Q. Now, then, if you put your tunnel under there and tap that

stream to the extent of a thousand inches of water and intercept these percolating waters to the extent of one thousand inches of water, you think it will affect the Los Angeles river, the flow there?

A. Yes sir.

Q. You seem to be quite positive of that?

A. Yes sir.

Q. Doesn't it depend entirely upon the correctness of your theory, that there is water enough there to supply both the river and that drainage?

A. Well, I don't see we are going to get a thousand inches out there.

If you had a reservoir capable of holding ten million gallons of water, perfectly impervious to water and twenty feet high; and you turn a stream of water in there of a thousand inches, measured under a four-inch pressure, it would fill that reservoir full, if the head was hi-h enough, and it would run over. If you had a pipe inserted in there which, when the reservoir was fill, was capable of discharging 500 inches of water under that pressure of 20 feet in height, 500 inches of water would continue to flow over the top of the reservoir, and flow over just the same as before you put the pipe in. If you put another one in that was capable of flowing
352 just another 500 inches, so that the exhaust was exactly equal to the supply, that reservoir would still stand full, but it wouldn't be yielding anything.

Q. It would be yielding the thousand inches?

A. Oh, no, the stream running in is what is yielding.

Q. I am talking about the reservoir itself. The water will stand there on the level?

A. Yes, that is all right; but that would be merely a little expansion in your pipe, that is all. The expansion yields nothing. If you let in just as much as you let out the expansion don't mean anything.

Q. Please answer the question one thing at a time, and don't anticipate any difficulties. The water would stand on the level wouldn't it?

A. If there was just as much running in as ran out, and it was full when you started out, it would stand at a level, yes sir.

Q. Now then, if you were to add anything to that exhaust and make the exhaust exceed the supply, you would lower the water plane wouldn't you?

A. Yes sir, you would soon empty that reservoir.

Q. Can you tell us that the difference is between that and the water under ground? If the Los Angeles river is carrying off 2,000 inches at the lower end of the Pomeroy and Hooker tract, and that is supplied by an upward pressure from below, and you tap that upward pressure, if the upper pressure makes you exceed the 2,000 inches by 3,000, if you would tap that and take off 1,000 inches, do you say it would make *make* any difference in the amount of flow in that river?

A. It would certainly draw from the river, because the surface

flow of the river is supplied from that very underflow. It must be an underflow first, before it has a surface flow.

Q. And it is supplied because the water can make its way up easier than it can go off the other way?

A. Yes sir.

353 Q. Just as long as you have a surplus, will it not also come up more easily than it will run off the other way; so that if you relieve that pressure at one point, it just simply enables the more water to come up underneath. Isn't that so?

A. There is a limit to that water that is coming up underneath.

Q. Of course there is. Your whole theory is based upon the assumption that there is only 2,100 inches of water running underneath.

A. I wouldn't care if there was 20,000 inches running under there. You lower that saturation plane there and the quantity of water that you will increase—the quantity of diversion at that point is limited. It is limited to the quantity of water that would be flowing through that piece of section above your drain. Now, if there is a thousand inches running in that, why, you will get it; and if there is 500, you will get it; and if there isn't any, you won't get any increase.

Q. If I understand you correctly, there is no difference between us now. I agree with you that there is a limit to it; that you can't go on developing 20,000 inches of water out of 10,000. Now, Mr. Eaton, you spoke about the bubbling-up in the bottom of the Los Angeles river?

A. Yes sir.

Q. You say that at some points you can see quite a little stream bubbling up?

A. Yes sir, and at others you don't observe that. It is uniformly the case, pretty much, all along the stream. There will be an interval of a few feet in which the upward motion is not so very observable; and then, at other points, there will be quite a perceptible motion underneath, the — coming up from the bottom. Wherever there is an increase in the river, you will generally find water boiling up in places from the bottom. Sometimes it is running in little streams from the sides; and other places you will see it is boiling up. And that is not a thing which you see at one or two places, but all along that whole stretch, across this tract of land you

354 will find at intervals this boiling process that is visible; and at other places it isn't. Some places it is very distinct; at others you don't perceive it. That is the same case with the sides of the banks. You will find it running in little streams on the sides in places, some places none running at all. I saw the cuts made on Pomeroy and Hooker's land. I observed the same appearance substantially there that I did in the river bed, both as to the sides and the bottom. There is nothing more than an artificial cut or depression in the saturation plane as the river is a natural one, and supplied on the same plane that the river is itself, exactly; the same waters. I paid close attention to the places where I could see the water trickling down in little streams in the excavation. I observed

some of them in those cuts. I observed the whole length of the cuts for the purpose of ascertaining what was the process by which the waters got in there. I was in the employ of the city when I went up I saw them raise up from the sides and bottom. I was there for the purpose of enabling me to testify in this case, and I observed the cuts minutely and the bottom and the sides.

Q. Now, you say that in some places the water was just barely oozing in, and at other places there seemed to be little streams. Now, didn't you pay enough attention to see that where the water came down the sides of those cuts in little streams, it was simply because the material, being a little different, the perspiration, as it were that was making a way to the surface, would slough off little portions, and come down the banks in the streams just the same as the perspiration from your face, as it accummulates in places, rolls down.

A. I don't believe those streams were flowing to the magnitude they do at the discharging point; that is, within the material. But you couldn't see back into the material far enough to distin-
355 guish that they were anything else but streams. They were not of magnitude; they gather as they approach the edge of the stream. They gathered with other little streams that were coming in.

Q. Couldn't you see many places along the sides of the cuts where the dirt had sloughed off, or tumbled in, from the effects of those accumulations at different places of the water?

A. Well, you will find little streams coming out there also.

Q. Well, in some places you would find they had tumbled off and they weren't little streams?

A. Oh yes there are places where you can see it sweating out, and other places where it comes in streams, and other places where it boils up in the bottom. Where you could see these bubbles from the bottom, all around the bubbles there appeared to be a little fine sand that was thrown out from the interstices of the little channel this water was coming out of. As it approached the surface or bottom of this cut, of course the resistance became less all the time and the velocity greater; sufficiently great to carry this sand up.

Q. Did you observe whether or not where this boiling process was going on, that the material was of different kinds right around that spot? That there would be mixtures of clay and gravel and sand, and some portions of the sand would be finer than other parts?

A. Well, if I had made an investigation there, it wouldn't have led me to anything, for the reason that it had been disturbed, the surface, and you couldn't judge from the surface what was underneath.

Q. Well, the surface of the river wasn't disturbed, was it?

A. No, I am speaking about the cut. Do you refer to the river now?

Q. Yes, the both of them. The river and the cut are presenting pretty much the same phenomena, aren't they?

A. Well, you couldn't tell. I observed one of the places closely,

in the Pirtle cut; the material. It was gravel in there, and
356 I took a stick and ran down into it about eighteen inches. I didn't try that in the river or in the cuts on the land in controversy.

Q. Don't you know that those bubbles in the bottom that were coming up there were just simply aggregating into a spot where the resistance is small on account of the difference in the material?

A. Of course the waters under ground concentrate into the portions of this cross-section which offers the least resistance and flows in channels. The velocities are greater in one place, fifty times, than they are in others. There are velocities in there that don't move a foot a day.

Q. How large was the largest of those streams that you observed, either in this cut or in the river?

A. Oh, they are very small. You mean the boiling up?

Q. Yes, and the little seeping out of the side.

A. They are very small. I noticed some pretty big ones up in the Pirtle cut.

Q. Well, by that I suppose you mean as big as a pencil.

A. No, I mean where the channels concentrated and formed six or seven miners' inches.

Q. Well, in these cuts there are one hundred and twenty-three inches.

A. No, I mean little minor channels coming in on the sides; I don't mean the whole channel.

Q. In these cuts I have been talking with you about, you didn't see any such thing as that there, did you?

A. Oh, not such volumes as that, no. I didn't go along the whole six-hundred-foot cut; I went along the 1,600-foot cut, the lower one, towards the eastern end of the ranch. I didn't go along the whole of the other one.

Q. About how many streams do you think you saw flowing in the 1,600-foot cut, from one end of it to the other and on both sides?

A. I didn't count them. There is a whole lot of them.

Q. Well, I haven't any idea that you did. But would you think there were less than a million?

A. I wouldn't make such a foolish——

357 Q. That would be more ridiculous than the velocity of the water on this lower section, wouldn't it, the cross-section you have been speaking of. I think you said, applying your principles to the velocity there, it would be ridiculously low.

A. Yes, sir, fully one-third. It would be one-third or a quarter of what I would imagine would run through there.

Q. And it would be still more ridiculous for you to assume even to guess at the number of these streams in one of those cuts.

A. Well, I am not guessing on that. I am taking the actual flow of this river, that boils up in this river in a given area, to get at my estimate of what is flowing down that cross-section.

Q. Yes, but I am talking about streams that you saw in the cuts, and in the river side, and the bank. You never tried to make any estimate of those, did you?

A. Oh, no. No object in making an estimate of the quantity of them.

Q. Now, on the mountain shed proper, you have divided that into two classes; one the foot-hill, and the other the main source of supply.

A. Yes, sir. I took for the foot-hill part an average of eighteen inches, area 127 square miles. That would give 8,500 inches, measured under a four-inch pressure, of a constant flow. I give thirteen and one-half inches for the total run-off. That includes storm water. All the water that passes off. That thirteen and one-half inches is run-off in miners' inches. The available crop for the foothills is 1,018 inches. That goes into the ordinary flow of the Los Angeles river, and the balance of the 8,500 inches is evaporation and storm water and plant life, 7,482 inches; 60 per cent. of this is run-off.

The witness on the cross-examination, being resumed on March 21st, said that he would like to correct some wrong figures he made yesterday, and he corrected as follows: I gave the increase of
358 the river between the Pomeroy and Hooker land as 989 inches which is simply a mistake, in which I put the figures down. I find that the flow of the main supply ditch is 750 inches. The flow in the river at the east boundary of the Pomeroy and Hooker tract 1,823 inches, making 2,573 inches surface flow on the Pomeroy and Hooker land, at the lower cross-section. At the borings in the city of Los Angeles, near the Southern Pacific Railroad bridge the measurement in the river was 2,830 inches, giving a difference of 257 inches to which is to be added diversions that were being made at the same time between these two measurements through the water companies' diversion, underflow, 700 inches, and surface diversion 546, added to 257, makes 1,503 as the difference between the flow of the river at the Pomeroy and Hooker lands, and this lower cross-section mentioned. All these figures correspond with the ones I gave yesterday. I just misplaced them and made a wrong subtraction.

The COURT: I don't understand those figures yet, Mr. Eaton.

A. If the main supply was turned out into the river, there would be 2,573 inches flowing in the river on the Pomeroy and Hooker land.

Q. I understand that, but the 2,830 down below is what I don't understand. Is that the amount actually flowing in the bed of the river at the lower cross-section?

A. Yes, sir.

Mr. CHAPMAN: So there shows a gain of 257 inches in that alone.

The COURT: Why, isn't it a gain of 1,007 inches?

Mr. CHAPMAN: Because there is 2,573 at the eastern end of Pomeroy and Hooker tract, including the 750 inches in the ditch.

The COURT: But that 750 that is in the ditch there never gets into the river any more, does it? It is not in this lower cross-section.

A. No.

Q. Eighteen hundred and twenty-three flowing by the eastern

end of the Pomeroy and Hooker land, and 2,830 at the lower
359 cross-section, isn't that an increase of 1,007? In the natural flow of the river, I mean. And in addition to that, whatever is diverted between the two points.

By Mr. CHAPMAN:

Q. What is your answer?
A. Well, now, let's see. There is 750 in the ditch, and 1,823 flowing in the river, making 2,523 inches at the upper point.

By the COURT:

Q. That is right.
A. Now at the lower point there is 2,830 inches.
Q. That is flowing in the bed of the river, as I understand it.
A. Flowing in the bed of the river, yes, sir.
Q. And that doesn't have added to it this 750, because that is away out over the hills, when you get to that point, and if that had been running down the river, there would have been 3,580.
Q. That is what I mean. That makes 1,007 inches of actual rise in the water of the river between the two points, and doesn't the city take out this surplus diversion between those two points?
A. Yes.
Q. You would have to add that 546.
A. Yes, sir.
Q. That makes 1,553 as the actual rise in the water of the river between the lower end of the Pomeroy and Hooker tract and the cross-section near the north boundary of the city. That is right, isn't it?
A. Fifteen hundred and three, I have.

By Mr. CHAPMAN:

Q. Will you give us the figures again, so we can have them in compact form. Your 1,823 inches is at what point?
A. Near the east boundary of the tract. That is after the 750 is taken out. Then, at the cross-section there is 2,830 in the river bed. That would leave 1,007, the difference between the river measurements.

By the COURT:

Q. And then the city water company takes out 546 between
360 these two points, from the surface.
A. Twelve hundred and forty-six.
Q. Seven hundred of that is underground diversion, isn't it?
A. Yes, it is all diversion.

Mr. CHAPMAN:

Q. Five hundred and forty-six on the surface.
A. Yes, sir, and 700 underground.
Q. That makes 2,253.
A. Well. Now, you subtract the 750. I want to get the differ-

ence of flow between the Pomeroy and the Hooker lands and the lower cross-section.

Q. Isn't that it? 2,253 inches?

A. No. There is 750 that is flowing in this ditch that would otherwise pass over the Pomeroy and Hooker land.

By the COURT:

Q. It would also go down to the lower cross-section, wouldn't it?

A. No, it don't go down.

Q. But if it was turned in so as to run across the Pomeroy and Hooker tract, it would run down across the lower cross-section, and you would have to add it to both places.

A. But that don't give you the increase from the Pomeroy and Hooker land down to this point, because there is 750 inches in addition that is taken out by this ditch.

Q. Try it now. Add your 750 inches to the 1,823.

A. Making 2,573. Now, we measured down below 2,830.

Q. Now, add 750 to that. If you let it run down it would run all the way down?

A. Why add it again?

Q. Why add it at all, I say? If you add it at one end of the stream you would have to add it to the other?

A. Well, figuring in the way the judge figures, it is 2,200 and odd inches, deducting——

By Mr. CHAPMAN:

Q. I was taking the figures you gave me. You say at the cross-section there is 2,830. At the eastern end of the Pomeroy and Hooker, there is 1,823. That is in the river, running. That
361 would make an increase in the river running between the east end of the Pomeroy and Hooker tract and the cross-section, of 1,007 inches. Now, you say 546 surface flow is taken out by the water company, and 700 inches underground flow. If you add those to the 1,007 it makes an increase of 2,253.

A. Deduct 750 from that and it will represent the increase between the Pomeroy and Hooker and the lower point.

The COURT: That is what I don't understand.

Mr. CHAPMAN: I don't understand it either. And I think you are mistaken in your figures, unless you include in the 1,823 inches the 750 inches which is taken out by the ditch, which you say you didn't include?

A. No.

Q. Well, if it was put back into the river, according to your theory, there would be, at the eastern end of the Pomeroy and Hooker tract, 2,573 inches.

A. Yes, sir.

Q. Well, now then, you would have to add that 750 to your increase down here, on the theory that you are taking?

The COURT: That would make 3,580 down at the lower cross-section, instead of 2,830, because the water would stay in the river after it was added, I presume.

A. Well, now let's leave the ditch on the Pomeroy lands; let's leave that diversion out, and we will take the two measurements in the river. Now, there is 1,823 inches up there on that land, at the eastern end. There is 2,830 in the river down at this cross-section, making 1,007 inches difference of increase. Now, in between these points there — 1,246 inches diverted by the water company.

Q. Well, now, if that was in the river instead of being diverted, it would make 2,253 inches, wouldn't it?

A. If it was in the river instead of being diverted you would add that to the 2,830 inches.

The COURT: It would make the same thing, 4,076.

The WITNESS: Now, you take 1,823 from that.

The COURT: There would be 2,250 left.

362 The WITNESS: Yes, sir. Now, you have got 750 inches that wasn't flowing at the upper end, which, if you had it, would have been 2,573, which would have made 750 more. That you would have to deduct from this, making 1,503 inches.

The COURT: I don't understand yet why if you add the 750 inches at the upper end you would not have to add it also to the amount flowing at the lower.

The WITNESS: No, you don't have to do it. I am satisfied that I am right about it.

By Mr. VARIEL:

Q. When you measure- the 2,830 at the cross-section, was the water from this main supply ditch, turned out?

A. No, the water was running in the main supply ditch. There was 750 inches in the ditch and 1,823 running in the river.

By the COURT: The 750 that was in the main supply ditch is not included in that 2,830?

A. No.

By Mr. CHAPMAN:

Q. If you turned that into the river at the time you made the calculation, that it was 1,823 at the eastern boundary, then, theoretically, at least, there would have been 2,573 instead of 1,823, wouldn't there?

A. Yes, sir.

Q. If you deduct that from what you found in the flow at the cross-section of 2,830 inches, you see there would be an increase less than 300 inches. But you have to put in the 750 inches again, because presumably upon your theory it would go down again and reappear at the cross-section. You have either to leave it out at both ends or put it in at both ends, provided you are figuring on the amount of the increase. If you are getting at the amount in the river, of course you include all these things. What, according to your figures, would be the whole flow, both that which is diverted by the supply ditch and what you found in the river, the city water company's diversions and any other that you know of, down to this cross-section? You had 750 at the ditch?

A. Seven hundred and fifty in the ditch, and 1,823——

363 Q. Yes, but that is only available for the purposes of the increase. You found 2,830 at the cross-section?

A. Let's take all the diversions and see how it comes out. There is 750 diversions above in the supply ditch, and 1,246, the two diversions between, the diversions by the water company. There is no other diversion. Then we take the 2,830 at the cross-section and add to that.

By the COURT: Forty-eight hundred and twenty-six. Now, you deduct your 2,573 from that and you get your increase.

By Mr. CHAPMAN:

Q. Is that correct according to your idea?

A. We have 750 inches diversion at the upper point and 1,246 by the water company. After those diversions are made we measured 2,830 inches. Those two make 1,996, and added to the 2,830 that would represent the whole flow. Then deduct 2,573 and that leaves 2,253 for the increase, and then that 750 wants to be added lower down at the lower place.

The COURT: The 750 is already in that calculation, the way you have it made, and don't have to be mentioned any more. It is accounted for. That makes the increase between the head of the main supply ditch and the lower cross-section of 2,253 inches.

The WITNESS, continuing: The Verdugo watershed is away about the lower cross-section, and some of this increase is due to that. I estimated 750 inches. The city water company's diversion of the surface water is about seven or eight miles above the center of town on the Feliz ranch, near the Crystal springs. The Crystal springs is a part of the diversion of what I call the surface flow. I include anything that is taken out of that river bed. That is all river bed there, the whole country.

Q. Well, I know that is your theory, but you divided the diversion made by the city water company into two different
364 kinds. The one was surface flow of 546 inches, and another was 700 inches, being the subterranean flow.

A. Yes, sir.

Q. Now, I am talking about that which you include in the 546 inches of surface flow. Where is that taken from the river?

A. That dam has been shifted so much there that just at this present time I couldn't say, but it is above a part of the pipe which runs over it. They use the waters of the waste of this ditch to run into their pipes that they have under ground. The 540 inches that I speak of flows down in a flume. They use it for water power at their reservoir. The old one. That is located in the Elysian park, just opposite East Los Angeles. About 400 feet from the railroad reservoir, and about 2,000 feet from the railroad bridge, towards town. Below this cross-section. That is where they use it for power. They don't use it all the time. The measurements from which these computations were made were made on the 19th of this month, day before yesterday, by Mr. Compton. I wasn't there.

The 546 inches flowing in the diversion ditch of the city water company used to take the surface flow, was measured near the head.

Q. Is there any connection between that surface flow and the underground pipes?

A. There is no—there is once in a while. They run—well, I don't know where they run that. They use about a hundred inches out of that for the domestic uses. I don't know whether they dump it in the pipe system there. They dump it in above or below. The underflow there is from my own measurements that I made some time ago. They use some of the 546 inches surface flow at times for the purpose of supplying the city. The underflow is not sufficient but where they let it into the pipes does not make any difference. It makes a diversion from the reservoir.

By the COURT: It makes a difference whether it flows into
365 the pipe? Did you measure below where there was any possible means of their getting any of this 546 inches into it?

A. Well, this pipe measurement, though, was made some time ago.

Q. Is there any opening in the pipe above where they can run surface water in it?

A. No. There is no opening up above. They run it over that gallery. There was no direct flow into the pipe when I measured the pipe. I have measured the pipe at different times. Of course, if they run surface water into the pipe, it would increase the flow of it, but when I made my measurements there was no surface water flowing into the pipe above where I made my measurements, and there was 700 inches.

Q. So that, if there is any accessions to the pipe, it would only increase the quantity in the pipe above the 700 inches?

A. If there is any above in the pipe, it is measured; yes, sir. I didn't make any measure in the reservoir below where these pipes are laid, or below it within a short distance. I made a measurement a great many years ago. The city water company were, several years ago, putting in all those underground pipes. I think they started about 1884 or '85, probably '85, I should say they started in. They ran a cut into the Crystal springs. I started it myself before that—made a partial cut in there. Then they followed it up and made the cut deeper. Then after that they must have been a couple of years completing that work. They found that they didn't get all the water they expected from the Crystal Springs drain, and then they run a branch over towards the river and they paralleled the river and ran under it a long distance, and there's where the main supply of the water company——

Q. Now, they paralleled the river and ran under it.

A. Yes sir.

Q. But you havn't yet told me when they did it.

366 A. Well, I tell you that they started this work some time in 1885.

Q. Well, now, that was at the Crystal springs?

A. Yes, sir. And they dug that out and probably a year after-

wards they started in on the other. I was up there from time to time and saw the work progressing.

Q. Do you not know that the city water company completed that excavation and put it in operation in the latter part of 1889 or '90, to supply this city with water?

A. Well, I presume they didn't get it all done—the way they were working on it. They would put in a little piece and then apparently stop work. They were a very long while about it. I don't know that it was completed, and I don't suppose they consider it completed yet.

Q. They have been using it since the latter part of 1889 or '90 for the purpose of supplying this city with water, haven't they?

A. Well, they started to use the water that they got out of there probably in 1884—from the time they commenced.

Q. Now you are talking about the Crystal springs?

A. Yes, sir.

Q. I am talking about the pipes that were laid there for a considerable extent up the river, that you mentioned last as paralleling the river and running under it.

A. Well, I considered the whole thing the same kind of proposition.

Q. Well, it don't make any difference what you consider it. That is the pipe that I am talking about. Don't you know that it was completed and put in operation in the latter part of 1889 and beginning of 1890?

A. No, sir, I wouldn't say just what date it was completed. I can't tell you the year that they completed that work. At the time that work was extended up toward the direction of the river, the river bed wasn't at the same place that it is now. The river
367 was then running within about 200 feet from the cut, and somewhere near where their levee is now.

Q. And a little to the east of where the river is now?

A. Well, I think—I should say the river then ran down where their—somewhere near where their waste-gate flows.

Q. Will you please answer my question? Was the river at that time running to the east of the present bed of the Los Angeles river, along that section of country where that pipe was laid.

A. No, oh, no; they ran across where the old bed was. Their pipe is east of where the old bed was. In fact, the bed came down and ran all over their pipes there, and I think washed some of them out.

Q. Yes, sir. It did that in the floods of 1890, didn't it?

A. I don't know what year it was. I remember of them having a washout there. The pipes were already laid when that washout came and washed out a portion of their pipe. In 1889 or 1890, I was city engineer, I think. I wasn't doing anything much on the river at the time for the city. We were making some surveys, and I had some work to do for the city on the most all the time. I didn't measure the water in the river either above or below the place where the city water company's pipes were laid. I have made cross-section measurements below from the point where their pipes

were laid down to the present cross-section. That was when I was in the water works.

Q. At what place?

A. Oh, they were merely to satisfy my own curiosity. They were for no other purpose. I don't remember what they were. I never kept any record of them.

Q. Don't you know that there is, and has been, ever since those pipes were laid, more water running in the river, a quarter of a mile below where those pipes touched the river margin or intersected its bed—if that is the case at all—than there is either at or above this place?

368 A. No. I didn't say yesterday that when I made the measurements here at this cross-section within the last few days, that there was no water running below the Macy Street bridge in the river. What I said about the water running below the Macy Street bridge was, that when the city is diverting all the water from the Macy Street diversion, then there was no water running down there. They didn't use to divert all the water, and there was water running down there, but lately they have put in another pipe. They have doubled the capacity of that ditch. Now they have a capacity there to divert all the water. But a year or two ago they weren't. There was quite a stream running down there.

Q. Well, isn't there now?

A. Well, they are not using the water. Of course it is running.

Q. Has there been a time within the last seven years to your knowledge that the water wasn't flowing past the First Street bridge in this city?

A. There may have been. I don't cross the river every day. I suppose the quantity during the summer will vary there considerable.

Q. Do you know a time within the last seven years when the water has not flowed down as far as the Seventh Street bridge?

A. No, I—I can't say that I have observed it down at Seventh street, because I never cross there. In the measurements made within the last few years, we didn't measure the water at the First Street bridge, nor at the Macy Street bridge, nor at any point above the cross-section, and between that and the Crystal springs. Nor any measurements except at this one place, and the measure that has been made on the Hooker and Pomeroy land, and then these diversions that I spoke of. I have been in the employ of the city with reference to this particular trial a couple of months, I suppose. I have, during that time, made measurements of the amount of water in the river between the eastern boundary of the Pomeroy

369 and Hooker tract and this cross-section. The city water company's diversion is about three miles above the city boundary, and about opposite to Tropico in a western direction opposite.

I estimated the rainfall on the mountain area of this watershed at 179 square miles, and the average rainfall at 27 inches. That would furnish a constant flow for the year of 17,655 inches, measured under a four-inch pressure, and I had 127 square miles of foot-hills,

with an average of 18 inches. That would secure a constant flow of 8,350 miners' inches, and the valley at 182 square miles, and that as giving 10,000. I allow for the run-off of the mountain shed, one-half, or 13.5 inches. That would leave 13.5 inches for evaporation and plant-life loss on the shed. That would be 8,827 miners' inches. For evaporation and plant life on the foot-hill 2,555 inches, leaving 5,795 inches loss on the shed. In the valley there is a half-inch, or five-tenths of a foot run-off. Four per cent. would make 4 inches as a net, 400 from 10,000 would be 9,600 inches, and 9,600 inches for plant life and evaporation, or 96 per cent.

Q. In run-off, do you include the ordinary flow of the Los Angeles river, as well as the flood waters from the surface?

A. That is what runs off of the river you know. Then we take the percentage of that. The percentage of the run-off would be 60 per cent. of that run-off that occurs during storm water, leaving only 40 per cent. of those figures that I gave you there as contributing to the normal flow. That gives 160 inches for this 10,000 inches on the valley watershed, and 240 would be wasted in the storm. For the foot-hills there is 2,555 in this run-off; 40 per cent. of that contributes to make up the normal flow, 60 per cent. in the storm, making 1,533 inches storm water and 1,022 inches normal flow. Of the mountains, the total is 8,827 inches, as total run-off. Sixty
370 per cent. for storm water would be 5,296 inches leaving 3,521 inches as contributing to the normal flow. Those figures differ a little bit with my others, but it is a small matter, 70, 80 or 90 inches. The results of this give us 3,531 inches from the mountain shed, 1,022 from the foot-hills and 160 from the valley, that I think goes to feed the Los Angeles river in its ordinary flow; that is 4,712 inches.

For the storm flow from the mountain shed, 5,296; foot-hills, 2,555; valley, 240, making 8,091 inches as the storm run-off. For the Verdugo watershed, I took about 25 miles of mountains, with a 30-inch rainfall; 50 miles of valley, a 20-inch rainfall, and that includes clear down to this cross-section at the bridge, but don't include the Arroyo Seco. About 75 square miles. The run-off for the mountain was 17 inches, giving 12 cubic feet to the mountain. That would be 600 inches to the mountain. The run-off of the valley would be three cubic feet, or 150 inches in the valley portion's share. That makes a total of 750 inches, that I consider the shed would yield to the normal flow of the river. I have not figured this out as I did the other. I didn't figure out the Arroyo Seco at all. It comes in below this cross-section. I don't know whether I have made a considerable study of this general subject. I have given the matter some thought. Have made some few observations myself that satisfied me about what rules were applicable. I made one experiment in Mormon cañon in this watershed. I went to bed rock there, and obtained all the water that flowed out of that shed at Mormon cañon, and got an inch and a half from the underflow out of fifteen miles of watershed. By inch and a half I mean miner's inch and a half. It was in the summer that I measured it. I put in a submerged dam, and when I got down there to bed rock,

there was an inch and a half of water flowing at the bottom of the creek. The surface of the creek flows from fifteen to seventeen inches during the summer flow. The elevation above the
371 sea level at the mouth of the cañon, is I think, 1,000 feet. At the crest at the upper part of the cañon 3,792 feet; at the upper end of the cañon 1,118 feet. That is about five miles from the outer edge of the shed. I didn't formulate my rule for the percentage to be allowed for run-off, underflow, plant life and vegetation, from the results of my experiments there. I have information from other sources upon that question. In any considerable tract of country, such as we are dealing with here, there are conditions in the amount of rainfall due to local conditions or situations. That is the case here in the Los Angeles valley. Points separated by ten or a dozen miles, the rainfall is very much greater in one place than the other, and this southern country is not exceptional in that, but the same thing is observable most everywhere else, where it has been observed at all.

Q. The variation in the amount of rainfall in the San Fernando valley and Los Angeles; is that any greater than the difference between this place and others out to the east and south at even less distances?

A. I hadn't collected any data on the rainfall east of here, but I think you will find it will increase at some places east and also diminish, and to the south the same thing is true. Less at Santa Monica than it is in Los Angeles. I have heard Mr. Lippincott's testimony. Remember what he stated his rule to be.

Q. Well, he took the seacoast for his basis, didn't he?

A. No. He took Los Angeles. I don't remember of his saying that his principle was constructed upon the seacoast as a basis, but that as he had the record in Los Angeles; he disregarded the seacoast because there was such a trifling difference that it didn't make any difference in his calculation.

Q. Well, you say now that you accepted his rule?

372 A. I applied it to the nearest rainfall. Didn't go away off somewhere else to get a rainfall to apply it to. I supposed the rainfall in the valley was the proper place to apply it to, and when I was applying it to the valley I took the mean rainfall in the San Fernando valley, and took the elevations there and made my estimate of the elevacation from that. I took for the mountain shed the Newhall gauge, and the San Fernando gauge and the Van Nuys home gauge. I took the mean of it. It comes to about seventeen inches. And then I took the elevation of a 1,000 feet and took Lippincott's average of mountains which he said was 2,700 feet above sea level, making 1,700 feet above the valley of San Fernando and adding ten inches to seventeen, making twenty-seven inches. I didn't take into consideration the reduction of that rainfall that might be caused by the desert winds. The rainfall at Ravenna is very much less than the rainfall at San Fernando, and the elevation is about double. I don't know who kept the gauge at the Van Nuys homestead. The information that was obtained by the city engineer, was obtained from Mr. Van Nuys. He lives in Los Angeles now, and I guess he

has for the last ten or fifteen years. I don't know how frequently he goes to the ranch. I don't know that he didn't keep the rain gauge. He may have kept it when he was at the ranch, and some one else kept it when he wasn't. To be certain about the thing I took the three gauges and took the mean of them. I don't know who kept the gauge at the railroad station nor the kind of gauge that was used. I think the railroad company kept—this information was obtained from the railroad company. I think at all three of the stations, Ravenna, Newhall and San Fernando. I am not positive about that. The data that I have is the best the city engineer could obtain. I don't know what kind of a gauge was used, nor who kept it, nor how it was situated, except what
373 I have been told. I was told the gauges were different, but I don't know anything about it myself.

The cross-section that has been spoken of here recently, I have some knowledge of the borings there some years ago. I didn't make the borings. I simply was observing the borings that were being made. I was with the water company at the time, and I was there a great deal, and passing by there and saw the work going on. I think it was in 1877; and the borings were made by Captain Kelliher, or Moore. I think they were at work for the city. They were talking about putting in a submerged dam there at that time. The recent borings for the purpose of investigating commenced about a week ago. I think there is four wells have gone down to bed rock; under the direction of the city engineer. He had engineers there in charge of the work. I don't know who the well-borer was. There were three borers there. I was there last Sunday and saw three outfits there and two of them were at work and one wasn't. One of the wells was about 200 feet or less, perhaps, from the western bank. In my investigations of the Pomeroy and Hooker tract and vicinity I have not personally had any means to ascertain what the velocity of the underflow is. There have been some investigations made for the purposes of this suit, but I wasn't present. When I stated that there are places in this section of land, where the water doesn't move a foot a year, I meant the texture is very close. We find very fine sand there and clay mixed with it. I don't think the water has ever had any movement to it. I don't think that the test of the velocity of the water at one point would furnish any very definite basis upon which to determine the velocity all over the whole tract. We didn't make any tests with that view.

374 Redirect examination.

By Mr. DUNN:

Q. I believe Mr. Lippincott stated that his rule was to take the seacoast, but that he took Los Angeles because the difference is practically nothing between them. Do you know what the rainfall is at Santa Monica?

A. I think it's 13 or 14 inches. The difference in the rainfall between Santa Monica and Los Angeles is very much greater than the difference between Los Angeles and San Fernando. Assuming the

elevation in Mormon cañon at the upper end is 1,118 feet and the lower end of the cañon 1,000 feet, the fall would be something like 20 or 25 feet per mile, but I think it has more fall than that; I know it has more fall than that. The elevation at the Van Nuys ranch is about 800 feet, and the mouth of Mormon cañon a thousand, that is a difference of 200 feet in six or seven miles probably, and the general fall of the water is not about the same, it is a little steeper at the mountains. It has a pretty good fall at the mountains and then it flattens out afterwards. I drove a tunnel in the San Gabriel river about a mile from the regular diversion point that the waters are taken out of there. There is gravel and sand and boulders. Coarser material than this. We had a hundred inches flow from that and it was thirty-three feet deep. The cross-section area was ten thousand square feet. That would be an underflow of a miners' inch to a square foot. That is the only tunnel I have ever observed.

Q. Now, Mr. Eaton, isn't it a fact that the work of laying the underground pipes for the Crystal Springs Water Company is not completed yet.

A. Well, I know—I don't think it is, because they are short of water now. During the summer months they have to draw about a hundred inches from the surface flow. I stated that, in my opinion, the water flowing under this land didn't have a uni-
375 form flow throughout the whole section. It flows in some sections very much faster than it does in another. It is because there is little resistance, due to the void being larger; coarser material. The voids are larger in uniform material, and there is less resistance in coarser material of the same voids as fine material, because there is less surface in contact. The molecular attraction is less. The same principle as discharging water through a twelve-inch pipe or through as many one-inch pipes as will discharge the same quantity. You will have very much more periphery in the number of one-inch pipes than you will have in the one twelve-inch pipe. Therefore, the resistance proportioned to the area through which the water flows is very much greater in the voids through fine material than through coarse.

By the COURT:

Q. You mean that the same amount of water in the space of time will not flow through a number of one-inch *the* pipes of the same area as a twelve-inch pipe carrying the same space

A. The friction is very much greater, because the periphery around the number of these one-inch pipes——

Q. I wasn't asking what the reason was, but the result would be, there would be less water flow through the one-inch pipes, is what you mean to say?

A. No. You just supply enough one-inch to deliver the flow of the twelve-inch——

Q. Suppose the capacity of the two, I don't mean the practical capacity, but the actual space inclosed in the pipes was the same?

A. The actual space was the same—the area being the same, under the same head, the flow through the one-inch

pipe would be very much less than through the twelve-inch, yes, sir. I figure out 4,826 inches of water flowing in the river and taken out of the river at various points down to this cross-section; 4,800 inches flowing on the surface by the time you reach this cross-section. Well, I have
376 figured out that the total yield from the underground flow of this watershed is between 4,700 and 4,800 inches. I accounted for the fact that I have taken out as much or a little more water by the time that I get to the cross-section, than the total yield of the shed, by the fact that 750 inches comes in from Verdugo. The difference between what we have taken out upon the surface and what is flowing upon the surface very likely ought to represent what is flowing underneath. But then these results we can obtain from rainsheds are only approximate. In my opinion so much water as represents the yield of this watershed for the normal flow practically all rises to the surface before it reaches this cross-section. Or four-fifths of it does, and the balance represents the underground flow at this point. Assuming that 19,000 inches of water had a velocity of ten feet an hour it could not go through this lower cross-section at all without coming to the surface in immense volumes, because the cross-section above there is very much greater than this. Over six times as great as the cross-section that we found below. If the velocity of the underground water was from about two feet per hour, and there was 19,000 inches of it, it would not be possible for it to go through this lower cross-section without coming to the surface, and making an immense addition to the surface flow. About three feet an hour would give, I guess, about three thousand inches. There is 19 thousand 5 hundred all together up there, and then there is 2,500 running on the surface, leaves 17,000 about running on the land. If there was that quantity running underground there and there was 3,000 running here, if it was running at that velocity, why, there would be 14,000 inches running on the surface down there, plus what is coming from the Verdugo. Carrying out that theory, there would have to be 14 or 15 thousand inches flow-
377 ing under the ground at this section. The material being the same in the cross-section here as it is up there, that is, having the same capacity.

Q. Is there any material addition to the surface flow of the river at the point of this lower cross-section, more than at any other points?

A. Well, this measure we made there day before yesterday shows a material increase between the Pomeroy and Hooker land and the cross-section.

Q. But is there a material increase at that point? Is not the increase all the way down?

A. Oh, yes. The large part of that increase takes place before it reaches the water company's diversion, four or five miles above this. There is fully six hundred inches increase above where they take the water out.

By the COURT:

Q. If there are 19,000 inches on this land flowing under ground, and this cross-section down below is of the size you say it is, how fast would the water have to go under ground to get through there and not show any more surface flow than it does?

A. About 18 or 20 feet per hour.

Recross-examination:

Q. Mr. Eaton, I believe you testified yesterday that you didn't think there is much difference between the amount of water that flows down here to the north boundary of the city in the Los Angeles river now, and what there was twenty years ago?

A. Oh, I didn't say about 20 years ago. I don't remember back twenty years ago. I said there might possibly be a little increase in the river due to cultivation. But there was some time ago a material increase in the river below Macy street. But that was due to a culvert, the Zanja Madre, which was made smaller, throwing some of the water out into the river. The Macy Street diversion hadn't the capacity to carry it but recently they have doubled it.

378 Q. Well, that don't increase the quantity that came down here to the north boundary of the city. You simply used less water in the Zanja Madre and more went off down the channel through the city?

A. Yes. Well, there possibly has been a little increase. I believe there should be a little increase. I don't think it is very material though. But I think it is due to cultivation up there. As they intercepted—these vehicles that stop this storm water and hold it back, why, it naturally should increase. Twenty years ago the Los Angeles City Water Company's pipes tapping this subterranean flow were not laid. About twenty years ago there was about as much water being taken by the city in the same vicinity of its main supply ditch as there is now. They took more water out of the Zanja Madre than at any other place.

Q. I am talking about on the Pomeroy and Hooker tract or in the immediate vicinity. The Zanja Madre taps the stream right inside the city, don't it?

A. Well, twenty years ago there was not as much water being diverted by that ditch as there is now, because it wasn't enlarged. They enlarged it in 1878–'79, I think. I am speaking of the main supply ditch. I know a company that was organized for the purpose of supplying the eastern portion that was known as the East Side Spring Water Company. I know where the excavation is that was made by them for the purpose of pumping water. I have seen the hole they dug there. That is below this cross-section, and I should judge about a mile.

Q. How far from the natural channel of the river?

A. Well, the natural channel is an artificial channel, made by leveeing.

Q. The artificial channel, if you please.

A. I should say 1,500 feet to the eastward. I think the size of the excavation was a hole about 20 or 30 feet square. I don't know how deep. I didn't measure the depth. It had water in it,
379 and I could not see the bottom. The water wasn't perfectly clear when I was there. There was scum on it and the pump wasn't running. I don't know how much they pumped out of that reservoir when they were running. I have seen the pump running, but don't know how much they pumped out when they were running it. I have seen the pump running from a thousand feet away from the pump in the road. Was run at the pump when they were running. I don't know whether the pumping made any impression upon the water, as to the amount of it, or not.

Redirect examination:

I didn't mean to say that I never saw the river dry at the First Street bridge. It used to be dry every summer there 15 or 20 years ago. I remember of laying a pipe across Aliso street.

Q. Well, I just asked you—you didn't mean to say you never say it dry, did you?

Mr. CHAPMAN: He never said so. I asked him if he saw it dry within the last seven years.

By Mr. SCOTT:

Q. Well, within the last seven years. Do you mean to say you never seen it dry at any time?

A. No. I didn't mean to say I have never seen it dry, because I haven't paid much attention to it the last seven or eight years.

BURR BASSELL was then recalled by the plaintiffs, and testified as follows: Have been in the employ of the city of Los Angeles recently, boring wells. Was personally in charge during the well boring, and kept a record of the wells. The record shows the material which I encountered at different points in the wells. The city well A1, on Defendants' Exhibit 17, the first material encountered was sandy loam; from five feet to ten feet, fine sand. From 15 to 18 a moist, clayey sand; meeting the water plane at 17 feet. From 18 to 21 was saturated fine sand. From 21 to 26 was small
380 gravel, with medium coarse sand. From 26 to 27 was coarse granitic sand and gravel, with abundant water in that formation. From 27 to 32 was coarse granitic sand and gravel. At 32 feet I met three inches of clay. From 32 to 34 feet very coarse granitic sand and gravel. At 38 feet one inch of clay. From 34 feet to 40 feet, the end of the well, very coarse sand and gravel.

City well A-2: From the surface to four feet a sandy loam soil. From four to 15 feet, very fine river sand, meeting the water plane at 15 feet. Fifteen to 20 feet, coarse sand. At 20 feet two inches of clay. At 26, from 22 to 26, from 20 feet and 2 inches to 26 feet, very coarse sand and gravel. From 26 feet to 35 feet, still coarser granitic sand and gravel, stopping the well at 35 feet.

Q. I will ask you whether or not, Mr. Bassell, the water flowed

through this strata—whether the same volume of water flowed through all the material in these different wells?

A. Well, below the plane of saturation it was all saturated, excepting the strata of clay that we met with, which contained little or no water.

Q. Could you determine, in boring, when you struck strata in which the water flowed more freely than in other strata. Can that be determined in boring?

A. It can, in some wells. When you strike a very coarse formation, very coarse sand and gravel, and, in some of the wells we met with, fine and coarse gravel with very little sand, when we would pump it out the water would be comparatively clear, showing there was very little sediment or fine material in that formation, but abundance of water.

The witness then proceeded to testify to the material of a large number of wells, but they were all substantially the same. The water plane met with practically at the same distance below the surface, the difference being accounted for by the difference in the surface topography. The water found in about the same
381 material. The witness also testified he knew the location of the wells which were bored by the defendants, but could not say from his own knowledge as to the depth to the water plane in those wells.

Cross-examination:

In none of those wells that I remember did I find bed rock.

Q. Did you leave in water in every instance? Did you ever go below the water-bearing strata?

A. With the exception of one well, I spoke of at the end of the tunnel line, where we struck the nose of the hill there, if you call that bed rock, I would say we met it. After we bored the wells we pulled the casing and filled the wells. We did it because we wanted to use the casing over again repeatedly. It don't cost as much as it would to furnish casing for each well. And then the property-owners objected to having a hole left in the ground where cattle could step in and break their legs.

We filled up the wells when we pulled up the casing. The well-borers were instructed to do so, and I think they did it. We generally pulled the casing up and filled the well immediately after we finished boring, or as soon as they were through taking down their derricks to move to another point. All the levels are made from the water plane as shown by those borings, which were abandoned immediately upon finishing. We could not always determine the water plant from those measurements made in that manner; it would depend on circumstances. I would sometimes measure the water plane in the morning after it stood over night. Generally we would measure the first water when we came to it, sometimes leaving it to stand a little while, to be sure it got to its normal
382 plane. And sometimes if we used a sand pump we would pump the water out and wouldn't get the true elevation.

And I was governed in the time when to take the measurement by my judgment. Generally took the measure of the water plane before we went down very deep. In the few cases where I waited until the next morning, I found very little change in the height of the plane of the water. Sometimes a few tenths difference.

FRED EATON recalled for the plaintiff, testified as follows:

The measurement of the river and the various diversions which I gave the other day in my testimony, were made by the city engineer and two or three assistants. On yesterday I measured the river at these points myself. I didn't measure it at all points; but all but one. That was measured by another party. The first place we measured was at the head of the main supply ditch. There was 960 inches in the ditch at that point, and then we measured it in the same ditch where it leaves the river and there were about 800 inches in the ditch.

The next point we measured was in the water company's diversion. We measured at the Crystal springs, and then down at the reservoir, noting the waste on the way, through the waters and so forth, giving us at the reservoir 966 inches. That was the surface flow and their underground pipes. The Chavez ditch was diverting 50 inches.

Mr. Lorraine at the same time measured the river below, down at lower section, at the narrows, and there were 2,098 inches. Assuming that Mr. Lorraine's measurement at the narrows was correct, the total surface flow of the Los Angeles river yesterday was 3,914 inches. In my opinion that is the total flow of water, if none had been diverted, which would have arrived at the narrows on the surface.

Q. State whether or not, in your opinion, the surface flow of the river was affected by rains at the time of the last measure-
383 ment, that you testified to the other day.

A. Well, the last measurement showed quite an increase below; a very material increase over the measurement at the narrows at this time.

Q. And your last measurement of the city water company's?

A. We didn't get through with that the other day. We were switched off onto something else. There was a lot of water there that was measured in that lower estimate. There was fully 150 inches at the upper end was measured. And then there was about 100 inches wasted in the water company's ditch there that we re-measured. The amount of water that I gave the city engineer as being diverted by the underflow of the water works the other day was 700 inches. Now, from the measurements I made yesterday there was only about 300 being diverted yesterday, by the underground works. That is a variable quantity. They have filtrating galleries, artificial beds, over these galleries, that they run the surface water over. And there is times when they are not running that water over the galleries, that the underground pipes don't deliver as much. And it is difficult to tell just what that is, without measuring it down at the reservoir. The condition was yesterday that I estimated 300 inches. There was one of the beds over the Crystal

Springs gallery. There was 250 inches flowing from that on the surface, and about 200 of it running down in a pipe that had a direct connection from the underground pipe to the surface. Two pipes at least. The time when I measured the Crystal Springs underflow in the filtration galleries before, it was 400 inches greater than it was yesterday. That was two years ago, and they must have had more water running then.

Cross-examination:

384 Before the measurement I made yesterday, it had been about two years since I had measured the water in the Crystal Springs Land and Water Company's pipe. That was in a suit of the City of Los Angeles against the Crystal Springs.

Q. That was commenced in 1891 and tried in 1893.

A. Well, the measurements were made a little before the trial. The trial was in November, 1893. I think it was two or three months possibly before that.

Q. And how long had it been before that since you measured it?

A. We only measured the water that was in the pipes. In all the pipes only once that I ever measured it, excepting this time. I measured the water once running in from the Crystal springs prior to that. The measurement at the head of the main supply ditch made yesterday was made in the ditch.

Q. Did you measure the water in the reservoir at that place at all?

A. We measured it below near the eastern line of the Pomeroy and and Hooker lands. The place we measured in the ditch below the head just where it leaves the river, is about a mile below the head of the ditch, I guess, or more.

Q. How much water was there?

A. 800 inches.

Q. And 960 at the head?

A. Yes, we measured—well, it was a cross-section in the ditch and we called it from 750 to 800 inches, where we made the second measurement. Where we made the 960 inches, we measured it in a kind of a flume that is in there. The narrows that I speak of is just above the railroad bridge of the Southern Pacific going to San Francisco, where the amount measured yesterday was 2,098 inches. It was measured about 200 or 250 feet north of that bridge, possibly 300 feet, and runs in a northeasterly direction across the valley; it runs on the other side along the line of Columbia street.

Q. How far is it across the valley there.

385 A. It is between 3,500 and 4,000 feet on the saturated plane. I think the saturated plane is about 3,500 feet. Our measurements averaged along about two o'clock, I should say. The lower measurement at the water works was between four and five o'clock. Close to five. The Los Angeles city works I mean. The measurement of the river at the narrows was about noon.

M. J. LORRAINE, called as a witness on behalf of the plaintiff, and being duly sworn, testified as follows:

Am civil engineer by profession. Measured the Los Angeles river at a point which is below the Southern Pacific bridge yesterday, inside the city limits. The surface flow of the Los Angeles river at that point was 2,072 inches, measured under a four-inch pressure.

Cross-examination:

Measurements was about 1 p. m. A little after that when I got there. I made no measurement on the 21st anywhere in that vicinity. I made measurements on several days, the last one before the 23rd was the 22nd, and the last one before that was the 20th. On the 22nd there were 2,077½ inches; on the 19 I made two measurements, one measurement gave 2,805 and the other 2,935½. I made all the measurements at the same place. The measurement on the 20th and 22nd of this month were made about four p. m.

Redirect examination:

Don't know why the flow was so much greater on the 19th than it was on the 22nd and 23rd. I examined the city water company's ditch above, but didn't measure it. I didn't examine nor measure the city supply ditch.

386 EDWARD DOWNES, called as a witness on behalf of the plaintiff, and being duly sworn, testified as follows:

Am a civil and hydraulic engineer and been in that business for 15 years. Been for the last ten days or two weeks in the employ of the city of Los Angeles, taking some borings at the narrows, just above the Southern Pacific bridge on Columbia street. Then in charge of those borings.

Witness's attention is called to a map marked "Map of the Los Angeles river. Profile on line of hills in Columbia street, showing cross-section of bed rock and place of saturation," and testified it represents the borings made there during the last ten days under my supervision, and the map is made from notes that I kept. Mr. Lorraine was there at night. The upper black lines represents the surface of the ground. The lower black lines shaded heavily with brown represents bed rock. The small blue surface above the upper black line at the left-hand side, represents the cross-section of the Los Angeles river. At that point the river flows close to the side of the mountain, against the rock.

Well number one is close to the river. The first seven feet was sandy loam, surface soil. From 7 feet to 23 feet was in blue clay and blue sand. And at—from 23 to 32 feet was sand and boulders; a little coarser material. At 32 feet we reached fine, coarse sand and blue gravel. Very much the same material as before, only a little different in texture. And that ran the same to 46 feet, where it was coarse blue sand. And that ran to 49 feet where we reached shale; a hard material that came out in flakes. And

we ran seven feet into that; bored seven feet into that material. The material is similar to the hills there. We encountered a good deal of that in the hills. It runs in strata. In my opinion that is bed rock. We found water in that well at the same level as
387 the surface of the river. It is right alongside of the river, very close to it.

Well number two: There is six feet of that surface soil. 10 feet was fine sediment, a sort of clay; from 6 to 10 feet, four feet of it. 14 feet was fine sand. 17 feet sediment, a sort of loam and clay mixed. 19 feet fine sand. At eighteen feet and two inches from the surface we reached water, surface water, the saturated plane. 25 feet coarse gravel, from the size of a pea up to two-inch cubes, boulders, small boulders. 30 feet was coarse sand. 33 feet small boulders and sand and gravel mixed. 35 feet, coarse and fine sand mixed; a little finer material. It ran coarse and fine in strata. 43 feet, coarse gravel. 47 feet, coarse sand. At 50 feet the sand was little finer. 52 feet, coarse gravel and sand. 57 feet the same material we reached at 52; it ran the same. 59½ feet, tough yellow clay. At 60½ feet, blue fine sand and clay sediment. At 63½ feet was fine sand and gravel mixed. 68½ feet, blue cemented sand. That was quite firm material. 69½ feet, tough blue clay. 71½ feet, sand and small boulders. 73½ feet, blue sand. At 75½, coarse gravel mixed with sand; sand and gravel mixed. 76½ feet, tough, blue clay. 77½ feet coarse gravel and sand. At 81½ feet, tough, blue clay. 83 feet, blue sand. 86 feet, blue sand and gravel and boulders. At 98½ feet, sandstone; quite hard; blue sandstone. We bored, I guess, six hours on that and couldn't get any further.

Q. State whether or not in your opinion that was bed rock?

A. That is what I took as bed rock. In my opinion it was bed rock.

The well number four was driven to a depth of a hundred feet. Number 3 wasn't bored. Number 4 was the next well bored. We didn't bore well number 3. I mean by that, that a well is there for somebody else to bore. The location is there. The wells were
388 supposed to be located about the same distance apart. About 490 feet apart, but the one which would be number 3 and number 6 were left undriven. All that is shown were driven. The formation comparatively the same.

In well No. 4 we drove the casing down to bed rock and then we drilled into it 25 feet without driving the casing in.

The formation in number 5 and number 7 were about the same as far as we—and in number 5—well, we were ordered to stop there and we quit at that point. There was no particular reason with reference to the land itself. At No. 7 we found bed rock at 75 feet from the surface. Went into the bed rock about six feet.

The plane of saturation as shown on the map of the narrows has a slight inclination towards the river in a westerly direction on the line of Columbia street. It is a little over four feet higher at the eastern end than it is at the river. The distance is 3,100 feet from the river, that is from well No. 7. The wells are bored along the street known as Columbia street. Where we bored No. 1 is only about a

hundred feet above the bridge. The railroad runs diagonally with the line of the wells. Crosses it diagonally. The bed rock crops out on the left-hand side of the map and also on the right-hand side on the ground. It crops out about the ditch.

The map was here offered in evidence and marked Plaintiff's Exhibit 26.

Cross-examination:

We bored in the bed rock in well No. 1 seven feet and were all day there boring in that material. In No. 2 we didn't go but about a half a foot in bed rock. We had a hand machine there and we were not in very good shape for drilling. No. 3 is the one that is not bored, and in No. 4 we went 25 feet into bed rock. We were
389 about twenty-four hours boring that distance in the bed rock. We were about forty-eight hours altogether boring the well. We had a steam machine in well No. 4. Have lived in the city of Los Angeles 10 years. Have been engaged in the business of boring wells and running tunnels before. We didn't go to bed rock in well No. 5. We didn't drill No. 6. We went about 6 feet in the bed rock in No. 7. We drilled there about 12 hours. Had a steam machine. The map upon which is indicated the vertical sections of the wells is not on a uniform scale. The vertical scale is greater than the horizontal. One is 10 times larger than the other. The horizontal scale is one inch to 60 feet and the other is one inch to six feet. We had been boring those wells about ten days, commenced on the 10th of March and quit on the 20th. Worked day and night and Sundays. We struck water at well No. 7, 36.8 feet from the surface. Well No. 5 we struck it at 38 feet. We measured down to 38 feet and eight inches from the surface, but that was just after the sand pump had been drawn out, and I don't think that was correct. We measured it afterwards, but I don't know what the measurement was. Made a profile of the surface by running levels over the ground, but I didn't make the survey on the surface. I have not testified to that. I didn't do anything but keep the borings. We struck the east side ditch on this cross-section on the prolongation of Columbia street. The ditch is about a thousand feet from the termination of Columbia street. We made no borings except along this line. Haven't tried in the river bed below there. I know where the east side spring is. I have never been right to the spot, but I know where it is. Where we did these borings must be a mile and a half north of there. I know where the Beaudry water system pumped the water that supplied the hills to the west of the city for a number of years. It was running when I came here. I know
390 about where they pumped the water from the river bottom, and my recollection is that it is pretty close to where we did this boring. South of it. My recollection is not distinct about that. It has been disused, I think, seven or eight years ago. The only well that we could tell from our borings whether there was any water in it was well No. 5. In that we didn't go down to bed rock,

and there was not much water in that. That is, it didn't run in very fast. We had to pump water in to cover the drill or sand pump. When we pulled it out it would exhaust the water, and it wouldn't run in again. The same with the others until we got down deep. Of course, we had twenty or thirty feet of water from the point we were drilling, and that kept supplied. After we got down to the water the material was sand and gravel, different sizes, and a great many boulders. Good deal of fine sand in coarse sand seemed to be mixed together. The bed rock that we got out came up through the sand pump in pieces. We drilled with a steam drill and then sand-pumped. The sand pump we had was a six-inch sand pump. Well No. 4 and also in well No. 7, an eight-inch well. Well No. 2 was a seven-inch. All the others were 7-inch. Since we got up this rock that I call bed rock, the shale is a good deal harder than when we dug it. The sand is harder, too, on exposure—the cemented sand. You can break it with your fingers still. You can break that easily with your fingers still, and the shale also. This rock was quite hard when we took it out.

Q. Where did you ever before have the experience of breaking rocks up into chunks of that kind when you were drilling down in the ground?

A. Those rocks that I showed you came right off of the surface. They were flaked off of the surface undoubtedly; but after we got down farther we didn't get any larger pieces, but we got
391 smaller pieces. We could tell quite accurately where the shale formation and the sandstone began by the materials we brought up in the sand pump. In well No. 1 we were in shale all the time. We didn't strike anything but shale. In well No. 2 we found sand rock. We didn't find the same shale that we found in well No. 1 in well No. 2. Well No. 1 was bored right down by the base of the mountain, and we struck the shale in all that well, in its perpendicular descent, struck the mountain base. After that we found shale in well No. 7 at a depth of about 75 feet from the surface. It was quite soft when it came up first. You could break pieces off of it with your hand. On each extremity of the line of the wells we found shale, but found none in well No. 2, or 4, or 5, but we didn't go to bed rock in 5. We didn't drill 6 and in 7 is where we found the shale on the eastern extremity. We bored in shale there about 6 feet; didn't get through it. Never got to the sand rock on that side. I think the shale is the bed rock and I think the sand rock is the bed rock.

Q. How do you know you didn't strike a boulder where you got these pieces out?

A. It didn't act like boulders. We didn't have any rounded surfaces. The boulders that we got—we broke pieces off of the boulders, and we would have a rounded surface, and you could see where it was broken from the boulder. Every time we got granite boulders we got it in that shape; and on this we had no rounded surface whatever. It was stratified.

Q. Well, that is the only thing that you could distinguish the bed rock—what you call the bed rock—from striking these

boulders, that the one did and the other did not have a rounded surface?

A. Well, the reason I think it is bed rock it's the same material that is in the hills, that I am familiar with. The tunnel that was run through alongside of the railroad there. I have been
392 through that tunnel. Spent ten days in it one time. Find the same material there. Shale and sandstone and strata.

Q. And it is bed rock?

A. It is evidently bed rock, because it is all bed rock there, that hill. I have been through there. That is the Zanja Madre tunnel, the old tunnel that runs from above Buena Vista Street bridge to the Southern Pacific bridge. It is about 3,800 feet long.

Q. What was the greatest depth you penetrated this sandstone which you take for bed rock, in any of those wells?

A. Well, this sandstone was a strata. They were quite thin strata of sandstone. A foot or a foot and a half. We penetrated the sandstone in well No. 2 about half a foot, and in well No. 4 we went 25 feet. And encountered the same material that we found in this well No. 4 at other depths. About 98 feet and a half we struck sandstone. We encountered it at 75 feet in No. 4. In No. 4 we went through hard and soft strata, but it was all sandstone. Pretty much the same as in the bottom, only it was harder and softer.

Q. But after you got through it, then what did you strike?

A. Why, we didn't get through it.

Q. Why, I thought you said you did?

A. We went through strata I said that were harder and softer, but we didn't go entirely through it. I mean that in these that I took to be bed rock, there were some portions of it that were harder than other portions. We found in sinking the wells sand at one place, clay at another, and boulders at another, and we went through them. But we didn't find any more boulders after that in the sandstone; and we didn't find any sandstone before we got down to this depth of 98 and 75 feet. On the wells marked No. 3 and No. 6 we didn't bore at all; we didn't start; and No. 5
393 went about half through that sand and gravel. So that between numbers 2 and 4 there is a space of about three times 490, that we didn't sink any of the wells in this bed rock. I had charge of the business under the direction of the city engineer.

Q. Did he direct you when you were boring this well No. 5 where you should stop?

A. No sir. Didn't direct me where I should stop. Told me when to stop, but didn't say about what depth I should go. He told us to stop. Whenever he told us to stop we stopped. He told us to stop work. I suppose he was in a hurry to get these things. That was the reason he ordered the work stopped.

By Mr. DUNN:

Q. Don't you know that is the reason?

A. Yes sir.

By Mr. CHAPMAN:

Q. How do you know it?

A. Well, I am not positive of it. I don't know the reason positively. I think that was the reason. I didn't hear him say. He didn't give me any reason. Just ordered the work stopped. We were boring on No. 2 at the time and setting up for No. 6.

Q. Well, do you mean you were boring on No. 2 when he told you stop boring on No. 5?

A. Yes sir.

Q. You were boring two wells at once, then?

A. He stopped the whole works. We were boring two wells at once there; we were boring three there most of the time; we were moving the machines on from one well to the other, at that time.

Redirect examination:

We did not at any point above the line which I call bed rock, strike any of the same material that is in the bed rock. It is a fact that the formation of the hills all around there and on each side is of alternate strata. Sandstone and this blue shale. That is
394 the case in the tunnel that I speak of in which I worked; and the materials are of different grades of hardness.

M. J. LORRAINE recalled, on behalf of the plaintiff, testified: I was in charge of these wells during the night borings and kept a record. Observed them when I left it at night and when I returned in the morning, that is, all but well No. 1. I had nothing to do with that. Was not present at any time when they struck what is marked as bed rock in well No. 2. I was there when they were working on bed rock. We worked all night on it. Was there when they worked on the most of the wells on bed rock. Saw the materials; the material was a little softer in some places than in others. No sand or gravel or anything of that kind. Was there when we bored well No. 7. I don't know about the hills on the north side. On the south side it is alternate layers of shale and sandstone. I think this material is the bed rock.

Cross-examination:

The sand rock brought out of wells No. 4 and 7 has not hardened any. The shale has hardened some. The sand rock was not saturated with water when we brought it up.

Q. Where did you see the formation in the hole?

A. Along parallel with the Southern Pacific railroad track on the south side.

Q. Well, in what? Were you in the tunnel?

A. I didn't go in the tunnel. There are passageways coming into the tunnel. I saw at the mouth of those. The holes on the south where I saw the material I think are a little lower in elevation than the surface of the ground on the east side of the river, and it is

about 18 feet above the river. That formation in the hole is shale and sand rock alternating. One superimposed upon the other. I do not recall which you first find. I think it is different in different places.

395 Redirect examination:

In giving the measurement of the water up there which I gave at 2,072 inches. That is the water flowing down the river. There is some more water besides that escaping through the dam, about 26 inches; it varies with the height of the water in the river. That would make about 2,100 inches altogether.

GERVAISE PURCELL was called as a witness on behalf of the plaintiff, and being duly sworn, testified that his profession was a civil engineer and by his testimony qualified himself as an expert in hydraulic engineering, and as having been practicing his profession on this coast since 1880, and as living in southern California since August, 1880, and continuing, testified: I have made three critical examinations of the Los Angeles river. The first in 1893 for the city of Los Angeles in the Crystal Springs suit. I was one of the engineers employed to investigate the matters. Did investigate it. The source of supply of the Los Angeles river is the mountain ranges of the Big Tejunga, Little Tejunga and Pacoima and some of the foot-hills around the San Fernando valley. The watershed, so far as my investigations goes, is, in round numbers, 460 square miles tributary to the river and above the land in dispute. Have got the sheet of record of rainfall obtained from the Government and other sources. The greatest rainfall during the time which this record was kept, was in 1884. There was in the city of Los Angeles that year 40.5 inches; at Newhall, at an elevation of 1,264 feet, 44.2 feet; at Ravenna, at the elevation of 2,358 feet, 29.09; at San Fernando, at an elevation of 1,065 feet, 37.2 inches; at Van Nuys' home ranch, 770 feet elevation, it was 33.62 inches. The least rainfall was in 1881. Los Angeles, 5.6; Newhall, 8.23; Ravenna, 3.36; San Fernando, 5.30; Van Nuys' home ranch, 3.45.

396 Supposing the Los Angeles river, surface flow, to be practically uniform year in and year out, excepting, of course, in times of rains and for a little time immediately after; but that it is practically uniform regardless of whether the preceding winter be dry or wet, would be a governing factor in my mind that would indicate the supply by which the surface and underflow was made, was governed by the least rainfall. The reason being because it could not exceed it. If it exceeded the amount given by the least rainfall, why then the river would fall off during the wet seasons. That is to say, the flow of the river is maintained in a state of equilibrium by certain gravel beds that lie to the northerly portion of it; and the absorptive capacity of these beds governs the flow of the river. Now, if we find that the river doesn't fall off during a dry or minimum year, we feel satisfied then that the absorptive capacity

of those beds cannot exceed what the minimum year would give; although they might be less. And if we find that the river does not increase in its flow during a summer after a very wet winter, that would simply prove that a greater amount run down in the flood than there did during the year when there was smaller rain. The excess would be discharged during the flood season, in flood water. Therefore, in computing the capacity of the underflow and surface flow of this stream, and the capacity of the sources, I figure it up, the greatest amount of discharge during the uniform flow that that watershed would give on the minimum year; and I say that, in my opinion, the flow of the upper and lower portions of that river cannot be any greater; although it may be less. From this I arrive at the conclusion that 5,200 inches was the total amount of water flowing through that ground at the lower end of the Pomeroy and Hooker land, both above and below. There are 460 square miles of watershed; of that one-third is rolling plain,

397 that would give no return, because it is shown that plant life evaporation and general agricultural uses will use up about 12 inches of rainfall, if it gets it. Now, in the minimum year, where there is only on that valley somewhere in the neighborhood of 3½ inches, why, of course there would be nothing left to run off. That is certain. Now, it is a well-known hydrographical fact that as the cultivated land increases, the fall of rain increases. And Mr. Lippincott stated here on the coast there is a general law that governs that; and that is that about .6 of an inch of rain falls for every extra hundred feet of elevation. Working on this basis, and taking the average height of that shed, as given here in testimony, at 2,700 feet, we get 11.58 of rainfall, on the 306 square miles that constitute the mountain shed. That is to say, a foot for each acre in the shed, or 189,764.8 acre feet of water, of that 40 per cent. will be absorbed, the balance will go to waste according to the best authorities. So, multiplying 189,764.8 acre feet by 40 and dividing by 730, to get the daily flow, we get 104 cubic feet per second, which multiplied by 50 (50 miners' inches in the cubic foot), gives 5,200 cubic inches. There is about 5,200 miners' inches of normal run-off from this watershed during a minimum year. That normal run-off, which includes underground water and the surface flow of the stream, would not be any greater in a maximum year than it would in a minimum year, because otherwise you would have a variation in the flow of that river. If the absorptive capacity of those gravel beds was a variable quantity, you would have a variable flow in the river. The great excess of water in the maximum years goes off in floods during the winter.

I know about the average surface flow of the Los Angeles river. Made some measurements there, and at the bottom of the Hooker land, taking the supply ditch into consideration. It is

398 about 2,500 inches all told at the east end of the Hooker land. Without the city ditches there is 2,059 miners' inches of water at the east end of the tract in controversy, according to my own measurements. That was on the 19th of February. The city ditch was running at that time. At the upper end 530 miners'

inches, at the lower end 410. That would make an approximate figure of 2,500 inches. That would leave, in my opinion, flowing under ground from this watershed at the point in the valley on the Hooker land, and opposite that between there and the mountains, about 2,500 inches. I know the total surface flow of the Los Angeles river, including the diversions from it, and taking the flow at the points where the cross-section at the narrows is, by investigations, but not by my own measurements.

Q. Assuming that if the water were allowed to run, there would be 4,100 inches normal flow at the narrows, surface flow, where does the 1,500 inches come from?

A. Well, there is watershed all the way down. There is the Verdugo watershed; it is very productive. The narrowing of the cross-section there would tend also to throw the underground water to the surface.

Q. Then, supposing the underground water were to be taken out back in the valley at the Pomeroy and Hooker land, and at a point opposite it, what would be the effect, if any, upon the surface flow lower down?

A. You cannot tap a system at the bottom and not affect the water at the top. It would certainly diminish it. Supposing the cross-section at the Pomeroy and Hooker land to be 123 feet deep, the proportion of this 2,700 inches which is flowing under ground there through that neck, which could be reached and made available by gravity flow, and brought into the city, would be, in my opinion, all that you could get above the plane where you entered
399 with the tunnel below, which, I believe, is about 3 feet below the surface. I think the majority of the water comes down into that neck. The trend is that way and eventually you would probably take all that there was to take, as it was served in by nature. But you could only take such proportion as would be in the water plane above the level of this tunnel, and the water which was down there, and from there down to the depth of 123 feet, you couldn't reach by gravity. Not except by pumping. If you were to run a tunnel in there on that land in the water plane and take the water out at the place indicated, and in the way suggested, you would affect the surface flow of the Los Angeles river. From the nature of the material there, I think it would undoubtedly be affected.

I don't believe that you could run a tunnel through there and take out water in any quantity from that land without affecting the surface flow of the Los Angeles river. Water taken from the underground flow of this river must eventually affect the water on the surface. It must eventually lower the water plane, and the effect of that would be to diminish the surface flow of the Los Angeles river, which surface flow is supported from the water below. It gets its water from below, because you will find the water rises from the bottom of the river, and if we were by any process to take the water from below the surface of the river, you would diminish the river by just that proportion. Because it gets its supply from below. That water that comes into the river in its normal summer flow is

due to the fact that the water that runs in the underground streams from the mountain watershed strikes the Cahuenga hills there, and in order to gather head to get velocity to get off, why it rises to the surface. The waters that come out of the Pacoima and Little Tejunga and Big Tejunga take a southerly direction there, on account of the natural fall of the
400 land: the natural grade of the land. If the grade of the San Fernando valley was practically flat, the waters that come from the watershed would probably break out a little farther than they do, and eventually swing around until they piled up against this southern hills there. If that San Fernando basin was perfectly flat, without grade in any direction, the basin would absorb the water that came from the watershed, to the amount of the absorptive capacity, and then the water would run off. It would absorb water alike all over, until it became utterly filled and saturated, and then would overflow in the weakest direction.

Q. Now, Mr. Purcell, in taking this southwest direction, in your opinion, how wide is the channel which the water fills?

A. Well, I think that water comes down and follows the natural channel formed by the flood and works along until gradually the absorptive capacity of the ground takes all the water and maintains that channel until some succeeding flood brings down debris and covers it over, and then it will take a new channel, possibly, a little to one side, and the same thing will occur one after the other.

The flow of the water southwest in that line as indicated by the washes, is not, in my opinion, of the same velocity at all points. There are old channels that have originally been surface channels, and been covered up by the debris from the hills, and afterwards become underground channels. The flow in these underground channels is checked by the materials that have lodged in there, so that the velocity becomes in proportion to the amount of check, and that I should think is decidedly different at different points. In my opinion, if you drove tunnels to the north side of the river you would intercept those underground streams and carry them off, and if your grade was sufficient, you would carry them off before they would have any effect upon the surface flow
401 of the river. Those waters are what makes the surface flow, and if you carry them off by tunnel you would diminish the surface flow. A tunnel constructed following the north line of the lands sought to be condemned, all the way around, at a depth of thirty feet below the water bed, would undoubtedly dimin-sh the flow of the water, in my opinion, and we could get considerable water. You would tap the main feeders of that river. I have made some figures on the outflow from the Verdugo watershed, and estimate it between 7 and 800 inches, and the surface increase between the Pomeroy and Hooker land, and this cross-section is about 1,500 inches. Of that increase 750 inches comes, I think, from the Verdugo cañon.

All of that does not come to the surface in my opinion. It is my opinion that owing to the smaller cross-section of the river at this point here, the whole of that water comes to the surface. That

would leave still an increase of 750 inches, and I think that comes from the underground flow, being forced up all the way down the river. The underground flow right through that land from the watershed of the Pacoima, Big Tejunga and Little Tejunga.

Cross-examination:

Have been in the employ of the city investigating this section of the country on three different occasions. First in 1893, in the Crystal Springs suit. Was engaged some considerable time then, to the best of my recollection, six or eight months. My investigations then were made right around the Crystal springs proper, and then we took in the general surroundings. The conditions there under ground, the underground formations are not, according to my recollection, other than what they are in the Pomeroy and
402 Hooker tract. I think they are pretty similar. We had a number of wells bored around the Crystal springs. I don't remember how many. The material was generally about the same as on this Pomeroy and Hooker tract. Such material as is accumulated by these classes of rivers. I don't know whether, on that occasion, I went quite so far as the Pomeroy and Hooker tract, because I didn't at that time know just where the Pomeroy and Hooker tract did go. I was up there during those investigations possibly four times, but I would not be sure. I was in the employ of the city next in the Spillman case, about a year ago, and we went over the Spillman property. We started in to make a much closer investigation with borings, and so forth, and in the meantime the city attorney made a stipulation with Mr. Spillman that ruled out the necessity of that, and that was stopped. How much was done I don't know. We didn't carry out that plan. I won't be sure whether any wells were bored or not. The Spillman property is just above the Crystal springs and pretty nearly opposite Tropico. The third time I was employed was for the investigations for this trial.

Q. And you say that the Los Angeles river, the water that flows in the stream proper, is a pretty constant quantity?

A. Well, my investigations in that direction and the testimony of Mr. Eaton here, led me to believe, or leads me to believe so.

Q. What investigations did you make beyond Mr. Eaton's testimony?

A. Well, I made some inquiries from Mr. Schuyler, who was acquainted with this river some years ago, and I remember away back, I think it was in 1883, looking through a case of the court that precedes the superior court, and my recollection is that the amount of water given was 50 cubic feet. It would seem to show 2,500 inches; about the same there is now, I don't know just
403 where that measurement was made. I, of course, have my opinion.

Q. Well, Mr. Purcell, if you don't know where the measurement was made, you can't tell anything whether it would indicate that the flow was pretty constant or not?

A. I have not stated of my own investigation. I know it to be pretty constant; I said as far as I could ascertain. From those who best knew, that is the state of the thing. It is now about three years since I was employed by the city to make these investigations, and I have known the Los Angeles river a long time before that.

Q. Had you never paid any attention to the flow of the Los Angeles river yourself?

A. Yes sir, in a general way certainly. I never made any measurements in the Los Angeles river until I did so within the last few years; only eye measurements; and in the last few weeks I measured at the upper end of this tract and the lower end, and the main supply ditch. I made some measurements in Mr. Hooker's development about the 19th of February. In the main supply ditch, at the upper end, there was 532 inches, at the second weir, where it turns around from the river and a little above the top of the Pomeroy cut, 521 inches. Then the third weir, 452½ and the fourth, which is the lowest down, 410.8. I measured the long cut on the Pomeroy and Hooker tract, just where it goes towards the river. The end of the cut, where it connects with the river, and found 128.85 miners' inches. I didn't measure the Los Angeles river there at all. Was measuring the water that ran through that cut. Measured the river lower down, at the lower end of the Pomeroy and Hooker tract, and found 2,059 miners' inches. Measured the river at the upper end of the Hooker tract above the main line of the main supply ditch, and found 1,146 inches. The difference between the two was 913 inches. That is the amount of water
404 that the river takes up through that tract. I didn't measure the water in the Los Angeles river below the Pomeroy and Hooker tract. I never did measure the water in the river below that tract. To get at the rainfall as I estimate it, I took the lowest rainfall record at the elevation of 770 feet, which is in the year 1881. That's at the Van Nuys home ranch, and that was 3.45 inches. Then calculated the increase according to the elevation by Lippincott's rule, and that gave me 11.58 or 11.60 inches, and I made my figures upon that basis, as constituting the rainfall of that watershed for that particular year. I made a good many calculations at different times. I didn't calculate the average rainfall, but, of course, it is an easy matter to figure the average rainfall there in San Fernando. On the plain it is 15.21 inches. I have made estimates of the average rainfall of that watershed. I have not got it here, because I didn't figure the outrun of the whole river by the average rainfall. A chain is no stronger than its weakest link, and the summer flow of that river being constant in character, caused by the minimum rainfall——

Q. Yes, that is according to your theory.

A. That is according to the facts.

Q. Can you give me an idea of what you assume as the average rainfall on that section?

A. I didn't assume anything, because we have a rain table right here and the average rainfall in that plain this rain table states—of that watershed; I haven't the figures here. I haven't assumed

that the flow of the Los Angeles river is 5,200 inches. I haven't so testified. I say that the amount that that river can flow, bottom and top, because I include the underflow, cannot exceed 5,200 inches. I didn't state that it is any such amount. It is probably a good deal less. How much less is a matter that would require a very exhaustive and extensive engineering exploration and a long
405 time to tell. We haven't got the data. I have assumed that the Los Angeles river is a constant quantity and that indicates these gravel beds are of limited capacity, and that capacity is measured by the minimum rainfall, or minimum flow in the year of the smallest rainfall. I know there is a variation from the average rainfall of the year from the smallest; and the largest rainfall would show a still greater difference from the year of the smallest rainfall.

Q. And your theory is that all that falls over this lowest rainfall must run off on the surface?

A. No sir, I didn't so state. I have no such theory.

Q. Have you got any theory?

A. I have stated exactly what I believe. I have said that the ordinary summer flow of the Los Angeles river is a constant quantity, and that indicates that the capacity and absorption of those gravel beds that govern that flow, are limited by the minimum rainfall, and that whatever falls over and above the minimum rainfall must find its way out of there and be dissipated by some other means. You might call it waste.

Q. You take it that the year that the flow of the Los Angeles river in its ordinary summer flow in the year of the smallest flow is the index to the capacity of the underground reservoirs by which it is supplied?

A. Yes sir.

Q. In other words, percolating waters?

A. Yes, in other words it is a governing factor.

Q. It is not only the governing factor, but it determines the whole thing?

A. It determines the fact that the river cannot be any more. If you had any lesser rainfall, or none at all, for a series of years, you possibly might have no river, but you can't have any more; and that leads necessarily to the conclusion that all that falls over that minimum average flow of the Los Angeles river must be done
406 away with through some other way than through the Los Angeles river. It must either go in floods or in agricultural uses.

By the COURT:

Q. Let me ask you a question right there: Doesn't that theory have to assume that the minimum rainfall is sufficient to keep those gravel beds full enough to supply this stream?

A. Precisely, Judge; that is the point I want to make.

By the COURT:

Q. If the minimum rainfall should fall below that, then the stream would decrease.

A. That is to say, if the stream took all that the minimum gave, but I have no proof that it does.

By Mr. CHAPMAN:

Q. Why not?

A. Why, there is no means of measuring with perfect accuracy the underflow of that river.

Q. But I have understood you to mean, or testify, that when you reach this celebrated cross-section, which has been born within the last few weeks, that then whatever has not been brought to the surface before comes to the surface?

A. Certainly; but that has nothing to do with the point. I say if you put through a smaller cross-section, what you have previously put through a larger cross-section, the smaller one will force it to the surface.

Q. The smaller one, in that event, in order to have that result, must be composed of different material, or the same material, as the other?

A. Substantially. Yes. If it were much more coarse material and permitted a vastly increased amount of water to flow through the same space, it would not necessarily bring any more to the surface. It would be a question of the cross-section and velocity.

I have been at the Pomeroy and Hooker excavations, both of them, and looked them over pretty well.

Q. What was the quantity of water flowing in the upper
407 end of those excavations, as compared with what it was where you measured?

A. I didn't measure that because I didn't want that information for the purpose I was making the other measurements. I didn't form any opinion about it.

Q. Didn't measure whether there was any more or less than there was——

A. Oh, yes, I think the water increased as we came down the bottom.

Q. What did you mean by the underground stream at one point in your testimony, and these underground channels, at another; what do you call a stream, or an underground channel?

A. Well, I will call the water that runs in an underground channel a stream, and I would call the channel the means by which that stream got out, the conduit, so to speak.

Q. Can you give us a more definite description of what was in your mind when you were speaking of cutting off those underground streams by the excavations to the north of the river on the Pomeroy and Hooker tract?

A. All I meant to convey was this: I don't consider that that water comes down in one continuous sheet. I consider that it comes down in a series of streams, some more and some less, and that while there——

Q. You don't think that the water permeates the soil all through and percolates its way through the interstices of the material through which it flows?

A. That word "percolates" has been so discussed that I would really like to know what you mean before I would understand the question.

Q. Well, the best authority in the world upon the meaning of the word is Webster's Dictionary, I believe; have you taken the trouble to look at it?

A. Yes, I took the trouble to look at it and it refers you to filtration and back from filtration to percolation, so I was rather at sea about it. It is not Webster's Dictionary use of the word, but I want to know what you mean by it when you ask the question.

408 Q. My meaning of it would be, perhaps, objectionable to the counsel on the other side. My understanding of an underground stream is nearly the same as a stream on top of the ground, that is, a watercourse?

A. Well, my understanding of an underground stream does not differ very much from yours with the exception that the channel of it has material in it which has been brought into it by previous floods, gravel or something of the kind.

Q. Your idea of this water is that it is diffused all the way through the soil. You don't know of any place that was being sunk that they didn't find water?

A. They might have sunk a good many places and didn't find water, that I didn't know anything of. I testified in the Crystal Spring land and water case, that from the examination of the map and the premises showing those 24-inch pipes, located as shown on the map and under the river, in my opinion the water comes mostly from the river, and I would give my reasons. The amount of water that comes along within 1,200 feet of the end of this pipe is about 9 feet per second. From that down, which is the longest portion, it only increases a foot and a half, which would tend to indicate that the larger amount of water comes from this upper portion that runs down the river. I so testified, and that is my opinion still. On the same occasion I testified that I had occasion in these researches to examine into the question of percolating waters, and underground flow. That I had made a personal examination of the bed of the Los Angeles river in the neighborhood of the Crystal springs. That I was there on four different occasions. I had heard the testimony of Mr. Bassell, in regard to the location of the wells and of the pipes and flumes and of the opening in the bulkhead, and the opening in the flume where it crosses the Crystal springs; and after this preliminary examination I

409 testified that the character of the formation of the soil around the springs seemed to be what you might call river bottom, and what was made by the river. Sands. And this question was put to me: "Q. Well, how is that soil; capable of absorbing or carrying water by percolation? A. Oh, yes sir; that soil would absorb 20 per cent. of its bulk, probably 30 per cent. under certain circumstances, of water." I so testified. That is, about 30 per cent. were voids, that would be filled up by absorption. I presume that is what I would say, and that I thought the water in those pipes

came down from the river, because the quantity was so much greater that the first few hundred feet from the river than the gain below there, and the point from which the measurements was made.

Q. Now, in similar soil, where an excavation is made and the increase is gradual all along the line, what would you say; is it percolating water, in your opinion, or formed by underground channels?

A. Well, if the increase was perfectly uniform, I would say that the cause of that water coming in was the same; but I didn't say that such a state of things could exist. I saw a good many wells that were bored on the Pomeroy and Hooker tract by the defendants in this action, and also those bored by the city, or under its direction. When the date was brought in the city engineer's office concerning the formation that was discovered by the borings of your wells, I looked into it. We made some calculations about the velocity of the water flowing beneath the soil, and we found that without underground streams to carry that water, the velocity would be inappreciable. That is to say, if it ran through it as a body, without underground streams to give increased velocity, so that I have not made up my mind what the velocity is. There is one thing that would seem to indicate it, and that is the amount
410 of increase in the eleven acres of the river. The amount of increase would seem to show a velocity there of about half a foot an hour. We didn't make any tests for the purpose of determining the velocity of the water through the soil. We had no data from which to make the calculations, on which I could testify as to the velocity of the water underground.

Q. Well, did you make any attempt to ascertain the velocity of the water. Did you make any tests?

A. On the ground?

Q. Yes, sir.

A. Why, such tests wouldn't prove anything at all.

Q. That don't answer the question.

A. I made no tests. If those who were acting with me made any, they were not made when I was with them. When the paints or dyes were put in there at any point on Pomeroy and Hooker's land, I wasn't there, and no report has been made to me that I know of. I say the ordinary flow of the Los Angeles river in summer time is, according to my computation, about 2,500 inches. At the lower end of the Pomeroy and Hooker tract. At the cross-section Mr. Eaton has testified that that was 3,900 in it, and something near 4,000 inches, and from what testimony I heard here, I should say that that includes the water that is supposed to have been diverted by the underground developments of the Crystal Springs Land and Water Company. Am acquainted with the tunnel proposed to be constructed by the city of Los Angeles on the Pomeroy and Hooker tract. The direction of it and the general plan; main tunnel and open-jointed laterals, to take the water in. Think it commences about three feet and goes up to about 32 feet in depth. I think that with such works as that you could take down all the river into the tunnel, if you wanted to.

Q. Well, I know you could. You could cut a hole right down into the river bed and clear across it and drop the whole river
411 into the tunnel. But I am talking about these works as they are proposed to be constructed.

A. Well, certainly, those works so far as they go, will take a certain amount, and that amount will diminish the flow of the river. I haven't figured on the amount those works would take. I suppose they have been figured to take the amount necessary for the present population, with the opportunities to increase for the future. Have made no calculation as extent that a tunnel 33 feet deep would affect the water plane on each side of it, because I don't think that is possible without an actual experiment. Those things vary very much. The cuts that would be put in there would supply some data. I estimated the quantity of water furnished by the Verdugo watershed, by figuring up the number of square miles, and took the rainfall, multiplied that—calculated in that way. I didn't make any very close calculation on that because it don't touch the question on the Pomeroy and Hooker tract. Suppose the average rainfall on the Verdugo watershed would be about 25 or 26 inches. Taking, though, the average elevation at about 2,900 feet and the rainfall of Los Angeles at 17.44 inches and applying the Lippincott rule, it would make about 3,400 inches for an average. I have not figured on the number of miners' inches that this watershed did supply at an 34-inch rainfall, because in figuring on the overflow from the Pomeroy and Hooker land, which is the issue in this case, I threw out the Verdugo watershed, because it is not tributary to it.

Q. Well, if I understand you rightly, it finds its way into these celebrated narrows, don't it?

A. It must; but I haven't testified as to the amount of water in these narrows.

Q. You don't mean to say that your 4,000 inches on the surface is any indication of the amount of water that really flows through the narrows?

A. Well, of course it is—it's an exact measure of what
412 flows on the top. There is some more flowing below, if it is 4,000, but mind you I haven't testified it was. I say that if the surface flow of that is 4,000 inches, that is somewhat of a measure of the water flowing through those narrows, because it shows what is forced to the surface, but how much there is flowing there that is not forced to the surface, I don't undertake to say. Therefore, I don't consider it important to figure on the amount of water of the Verdugo shed. I figured it on the amount of water that is on the lower end of the Pomeroy and Hooker land, and that in my opinion any water diverted from the land and carried away to some other place would be lost from the river below. I didn't arrive at that proposition from any actual tests of the thing by measurement of the water of the river, but from a common-sense principle that you cannot take anything from the bottom of a cistern without affecting the water on top.

Q. Suppose you were pouring 750,000 times as much into the bot-

tom of a cistern as you were taking away from it. Now, you can take something away from it without affecting the flow on the top?

A. Supposing I was putting a lot of water into the bottom?

Q. No sir; if the sources that were supplying your system were 700 times as much as the exhaust that was taking water away from there, would you exhaust it in part without lowering the water plane?

A. Mr. Chapman, you can't take one atom or particle from the universe without affecting the bulk of the universe.

Q. Well, now, we are not talking about the universe.

A. Well, if you take an amount of water off of any particular shed and bring in on to another shed, you diminish the water that was on that first shed.

Q. You diminish the whole amount that can be drawn from there.

A. Yes.

413 Q. But that would be owing to whether the water was taken from the river directly, wouldn't it, or by percolating, as to whether you draw it out of the surface flow of the river or not?

A. Well, I don't consider the surface and underflow as differing. I consider in this question they are intimately connected.

Q. They are one and the same thing?

A. Yes.

Q. Now, let me ask you before you go any further: Have you been giving your whole testimony upon that assumption?

A. That they are one?

Q. Yes, sir.

A. On this particular river, I say that the underflow and overflow are intimately connected, so far as I can see.

Q. Then, did you mean that the 4,000 inches of water that you think furnishes this constant surface flow includes also the percolating waters beneath the surface?

A. I have not stated anything about the constant flow of 4,000 inches. What I mean is that the top flow of the river, as seen and measured in the summer, is what I allude to as the constant quantity. I don't know what is down there. I measured it above at the lower end of the Pomeroy and Hooker tract, and there it was 2,500 inches, adding in the main supply ditch. And adding in what is taken out below the Pomeroy and Hooker tract, plus the amount flowing at the cross-section, makes about 4,000 inches, so I heard testified. I don't undertake to say anything about the constant underflow that may be passing this cross-section. I maintain that to measure the underflow and overflow with mathematical accuracy down to 150 or 170 inches, is not possible. I, therefore, base my intentions and figures on endeavoring to find out what it couldn't exceed, because if it couldn't be greater than a certain quantity, why, then we would gain that much anyhow.

Q. If it couldn't be greater than a certain quantity, in determining that quantity would you not consider it of any conse-

414 quence to figure up the amount of water that would have to be accounted for on the Verdugo watershed?

A. I will say that it wouldn't be of the slightest consequence, if

you measured that river at one particular point, over a series of years, and found that flow was constant, that would be a fair indication of the summer flow on the surface. The mere measurement of the surface flow wouldn't be any indication but what there might be sure-enough underground water-courses that was carrying off 2,500 inches, but it wouldn't be an indication that that surface flow was the excess of the whole, so to speak, the excess of what is below; what's brought to the surface. That it was the indication that source of supply was constant.

Q. For the surface water?

A. For both. Because the surface water is held up by the water below and the water comes to the surface from below, as you can see through that river yourself. You see it bubbling up.

Q. In your estimate, if you have made any, you say the water that falls upon the San Fernando plain there is a false quantity in this computation; that it goes to filtration and to support plant life.

A. Well, up to 12 inches of rainfall, according to the Newell curve, on undulating plains, there wouldn't be any run-off. On the undulating plains the plant life takes it up and uses that amount. We also find out from irrigation works that it is the same thing. I threw out the undulating plain on that account, because I say with a low rainfall it would yield no water. It is taken up in evaporation and plant life, and natural causes.

Q. Are you including in "natural causes" anything else? I understood you to say two or three times it was taken up in evaporation and plant life.

A. Yes, that is good enough. I don't know any other thing that could take it up. If that plant life were not supplied by that
415 amount of rain which falls on the undulating plain, then you would have to resort to——

Q. Which you have dissipated from this calculation, because it goes to support the plant life, and the loss in evaporation. Now, that is your proposition, isn't it?

A. Well, my proposition is that undulating plain, up to a certain amount, the water precipitated on it is used up in plant life and evaporation, and that amount is about 12 inches.

Q. Now, we have got that again. Just one thing further. Then, for that reason, you take no note of the rainfall on the San Fernando plain in your computation, for the purpose of ascertaining what is the amount of water that flows in the Los Angeles river and flows under the lands of this section of country?

A. Yes, I don't think that undulating plain supplies any. Now, if the 12 inches of rain that falls upon this undulating plain and supports plant life, didn't fall there, the plant life would either perish or would have to be supplied with water from some other source.

Q. Then why do you reject it?

A. Because it is a cultivated plain, used for agricultural purposes, and the history of those things shows that very fact.

Q. But the water which falls on a mountain shed around it is not

exhausted by supporting the plant life, if that plant life is supported by water which falls on the plain?

A. Well, that water runs off very much quicker because the plane of those hills is very much steeper.

Q. It is not consumed in the valley in supporting plant life, if the plant life is supported by the water which falls on the surface, is it?

A. No; that water comes down out of the whole shed is absorbed by those gravelly beds and given off into the river. There is a certain proportion of that water that falls on the mountain sheds
416 that is used up also. About 40 per cent. of that will be absorbed in those streams, and about 60 per cent. will be used up either by plant life or evaporation, or something else.

Q. Well, what life is there on the sides of those hills around that San Fernando valley?

A. Well, I presume there is sage brush.

Q. You say you presume; don't you know? Haven't you been up there lots of times?

A. I have been up that Pacoima there several years ago, and I have been over—yes, over parts of those hills. Oh, there is the usual things which you find on those hills.

Q. And the usual things which you find on those hills around in that section of the country is nothing, isn't it? Practically nothing?

A. Well, I wouldn't like to say that, but even if you do figure in that San Fernando valley, it wouldn't give you a very great amount more on a minimum year, although I shouldn't do it. I haven't done it. I would have done it if I had thought it advisable. I never made any actual measurements of the amount of water in that Verdugo cañon, nor in the Tejunga cañon, nor in the Pacoima. I have some measurements in the Tejunga about three miles up the cañon, but am not sufficiently satisfied with them to state them. I cannot tell who made the measurements. The weir was there. I presume made by some engineer. I wasn't satisfied with the report made of the measurement because it was too much. I believe the amount reported there was somewhere about a thousand inches. About three miles up the cañon. Afterwards I heard that some of the previous years it had been as low as 400.

Redirect examination:

I estimated the 5,200 inches as being the amount of the underflow and surface flow, through that point where the Pomeroy and
417 Hooker land is, cannot exceed. The Verdugo watershed enters the Los Angeles river just at the Crystal springs, where the Crystal Springs water pipes run into the river. It goes under right opposite there and brings into the river a considerable amount of water.

Q. Supposing the Crystal Springs Water Company or the Los Angeles City Water Company were developing 300 or 400 inches by means of their underground pipes at this particular point; would

that be noticeable upon the surface, taking into consideration the fact that the Verdugo came in at that point.

A. Well, as the increase would be larger than the outgo, it probably would not.

Recross-examination:

Q. How much water flows into the Los Angeles river from the Verdugo on the surface of the ground?

A. I don't know.

Q. Any?

A. Let me see. I don't remember really that I know any in the normal condition of the river. If the Los Angeles river flows 4,000 or 5,000 inches, I should think there would be no water flowing in at the surface from the Verdugo, but I don't know. I don't know whether there is any comes in on the surface, or whether it all sinks before it arrives at the river and comes up in the bed of either one or the other.

Q. So, that when you say the Verdugo supplies a considerable quantity of water to the river at that point, you are just assuming that it gets into the soil there and that it comes down, and comes into the Los Angeles?

A. No, I have been up that Verdugo cañon. I know several very good streams there. I know there is considerable water there, and that it all heads that way. All roads lead to Rome, as the old ancients used to say, and it all gets into the river.

418 Q. Of course, it must get there, but you mean that it comes there that way, but not on the surface of the ground?

A. It may come under ground or it may come over ground, or it may come both; I am not prepared to testify now on that, because I have no recollection. Of my knowledge, I don't know.

JAMES D. SCHUYLER was called as a witness for the plaintiff and testified, first, as to his qualifications as a hydraulic engineer, showing himself to be an expert in hydraulics, of considerable experience, and testified substantially as Eaton and Purcell, as to the amount of rainfall and the quantity of water given off by the watershed above the tract of land in controversy, the witness Schuyler making the amount about equal to a constant flow of 6,100 inches, measured under a four-inch pressure. That the greater portion of this came through the Pomeroy and Hooker tract. Testified to having seen the excavations, and noticed how the water comes into those cuts. Testified that, in his opinion, that if works were constructed on the plans proposed, and developed 3,000 inches of water, or any other quantity, it would affect the flow of the Los Angeles river and would diminish it. Testified to the waters being in contact, and that the waters so moving underneath the surface of the ground sustains the waters in the surface flow of the river, and that to develop any considerable quantity of water would diminish the flow of the Los Angeles river; but on cross-examination he testified that that would not be the case if the source of supply was greater

than the amount of the surface flow, plus the amount which should be developed by such works.

The plaintiff also produced other engineers who qualified as experts and testified substantially as those above mentioned.

Plaintiff also introduced many other witnesses upon the value of the lands, exclusive of any of the water which might be in
419 the soil, and they put the value, in their opinion, all the way from about $5,000 to about $15,000, but the plaintiff offered no evidence to contradict the estimate of the value of the water per inch on the premises developed, as stated by the witnesses for the defendants, nor to contradict the cost of the construction of the works, such as were proposed for the development of the said waters, to the amount of from two to three thousand inches; and upon the evidence being concluded on both sides before the jury, the court instructed the jury and gave to the jury the following instructions:

*Instructions.*

I.

GENTLEMEN OF THE JURY: This is an action whereby the plaintiff seeks to condemn for public use all the right, title, interest and estate of the defendants in the lands described in the complaint. The land is situated in and on each side of the Los Angeles river several miles above and north of the city of Los Angeles. The questions arising in the case involving the right of the plaintiff to condemn the property and the nature and extent of the defendants' estate and interest in the land to be taken has been determined by the court. The only question you are to decide is the amount of compensation which the defendants are entitled to before their estate and interest in the land can be taken as proposed.

II.

This compensation is to be composed of two parts or elements: first, the value of the interest and estate of the defendants in the land described in the complaint; second, the amount of the dam-
ages which will accrue to the other land of the defendants
420 which is part of the same parcel as the land to be taken, by reason of the severance of the land to be condemned, and the construction of the works thereon as proposed by the plaintiff. For the purpose of assessing this compensation and damages the right is deemed to have accrued at the date of the summons, which is June 27, 1893, and the actual value at that date is the measure of value for all property taken and the basis of damages for all property injuriously affected.

III.

The defendants' estate in the lands in controversy is an estate in fee-simple, but it is subject to the right of the city of Los Angeles in the waters of the Los Angeles river. This river flows through the land to be condemned. If the city of Los Angeles had no in-

terest in the river waters, then the defendants would have all the rights of riparian proprietors in those waters. As it is, their rights as riparian proprietors are impaired and diminished to the extent that the rights of the city effect those rights.

IV.

The city of Los Angeles is situated on the river below these lands and is the owner of the right to take from the Los Angeles river all the water that is reasonably necessary to give an ample supply for the use of its inhabitants and for all municipal uses and purposes for which the city may require water. This right is measured by the necessity and if the needs increase in the future, the right will expand to include all that the needs require. The right of the city is paramount and superior to the rights of the defendants in the waters of the river.

V.

The defendants, therefore, have no right to so use or divert the water of the river as to diminish the same so that it will not furnish the amount needed for the supply of the city as aforesaid and, in determining the value of the land to be taken, this fact must be considered, and the value of the land for which defendants are entitled to compensation is its value subject to the above-stated right of the city.

W. B.

421

VI.

After the wants of the city are supplied, however, the defendants have the right to use the water of the river on their lands for any and every purpose which does not interfere with the equal rights or injure the lands of other riparian proprietors along the river above and below this land. These rights include a reasonable use of water of the river on the land for irrigation, domestic purposes, watering stock or other lawful purpose; also to obtain power by means of the fall of the stream on the land returning the water to the stream before it leaves the land; also the benefit of having the water flow in its accustomed manner through the land. The right to use the water to irrigate the land through which it runs is subject to the condition that other riparian owners along the stream have the same right, and, if the water is not sufficient for all, neither has a right to use more than his reasonable share. All these rights are incident to the land because the river borders on the land; and they are not mere appurtenances, but are part and parcel of the land itself.

VII.

In exercising this riparian right the defendants have no right to carry any of the waters of the Los Angeles river off of their riparian land for use on land not riparian, nor can they sell it for use on land not riparian; and all surplus waters must be turned back into the stream.

VIII.

Rights in a subterranean water-course or stream are governed by the same rules as a surface stream of water; and the only
422 rights that the defendants, as owners of the lands sought to be condemned would have in any subterranean water-course flowing through their lands down to and through the lands of others (whether said stream flowed on such lower lands above the surface or beneath the surface of the ground), would be to make the same, but no other use, that they would be entitled to make had such waters flowed on the surface.

IX.

A riparian proprietor is not entitled to divert (for any purpose except for purposes for which he is entitled to make use of on his riparian lands as specified in these instructions,) any portion of the waters of a water-course, or stream, whether surface or subterranean; and he cannot by any indirect means make such diversion where he would not have been authorized to do so directly.

Therefore, a riparian proprietor cannot by sinking tunnels, or making other excavations, under the sides or underneath the bed of such water-course draw away for use on non-riparian lands any of the waters flowing in such water-course, although said excavations may not directly touch said stream; if, for instance, the water of such stream percolates into the banks or bed thereof to a considerable but limited distance, and such percolating water is stationery, or has very little motion, said riparian proprietor would have no right to make an excavation so as to draw off said percolating water, if the effect would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn by such excavation, any more than if said excavation was made so as to tap said stream directly.

423 X.

The mere fact that some of the subterranean water forming part of the stream on the lands sought to be condemned may be lost before reaching the point where the same would have gone into and made up part of the surface or subterranean stream of the Los Angeles river, would not give the defendants the right to divert an amount of said subterranean waters in said lands equal to or less than the amount so lost, if such diversion would have the effect of diminishing the waters surface or subterranean of the said river at any point above the south line of the pueblo lands of the city of Los Angeles.

XI.

Whatever additional market value the land may have had by reason of these rights and advantages, so far as they do not interfere with or impair the rights of the city aforesaid, this value the defendants are entitled to, as a part of the value of the land, before

it can be taken; and this value you must include in your estimate of the value of the land sought to be condemned.

XII.

In addition to these rights and benefits arising from the flow of the river through this land, the defendants are the absolute owners of all such water as may be present in the soil of this land and which does not constitute a part of the water of the river. This is usually called percolating water. There is, however, no magic in the word "percolating," and the fact that any witness may apply that word or refuse to apply it to any particular class of waters of which he may speak is not conclusive of the question whether or not such water
424 does or does not form part of the river. That question is to be determined by you from a consideration of the facts proven. The right and ownership of the defendants in this class of waters is distinct from and much greater than their right to the waters of the stream. As to the waters of the stream they have a right only to the use of it on this land, and they do not own its corpus, or its body or the very water itself and they have no right to take it away from the land and use it on other lands, or to sell or dispose of it for use on other lands, or at other places. But as to this other water, if any there be in this land, not a part of the stream, they are the absolute owners of it, to the same extent and as fully as they own the soil, or the rocks or timber on the land. Therefore, if, by any means, they can separate this water from the lands, they have an absolute right to the water thus separated and may conduct it away and sell or dispose of it anywhere as they see fit, subject only to the limitation that they may not excavate or do anything on the land for the mere purpose of intercepting such water and preventing it from flowing into the stream or water-course on the land of another and without intending to make any beneficial use of it themselves. Whatever additional market value this land may have had by reason of the presence therein of water of this class, or by reason of the feasibility of separating it from the land, or of using it on the land, or of conducting it to some other place for use or sale, or of the great market value of such water for such purposes, or by reason of all these things combined, or by reason of any other lawful benefit or advantage which this water gives, this additional market value inures to the benefit of the defendants and is a part of the compensation to which they are entitled in this case as the value of the land to be condemned.

425 XIII.

It will be necessary, therefore, for you to determine what waters upon or in this land are a part of the waters of the stream and what waters are not of the waters of the stream. This question is a question of fact to be determined by you from the evidence, under the instructions of the court.

XIV.

The Los Angeles river is composed of its main stream and any branches it may have, whether surface or subterranean.

XV.

While a water-course must have a bed and banks or sides, yet such bed may consist of any material which keeps the waters from penetrating below a certain depth, and such banks or sides may consist of any material which has the effect of confining the waters within circumscribed limits.

XVI.

It does not always follow that water which does not flow on the surface in a visible stream is for that reason not a water-course, or not a part of the water of the stream which does at some place run on the surface; nor need it flow in a defined channel underground as a solid body of moving water of any particular dimensions in order to constitute a water-course.

If you find from the evidence that there is a bed or river bottom filled to a considerable depth with sand, gravel or other porous material, meandering over which a stream runs on the surface and through and in which the water moves under ground, enough of it rising to the surface to supply the surface stream, and the
426 other portions of the underground water moving with a much less velocity than the surface stream, and through a wider or larger space in and through the interstices of the porous material, but in the same general direction as the surface stream and in connection with it, and in a course and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy, then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface.

If such water-course exists, it is immaterial so far as the water-course is concerned from or through what lands the waters flow in reaching the channel or whether they reach the same by percolation or by clearly defined streams.

XVII.

So, also, if you find that the water coming down on the surface in the streams known as the Tejunga, Little Tejunga and Pacoima creeks in the northeastern portion of the watershed is discharged on the plain known as the San Fernando basin and there sinks in the sand washes and flows down southwardly under ground through sand, gravel or other material easily permeable by water and along the courses and its channels which have been made by the streams of water from these same creeks flowing on the surface, but which channels were long ago filled up with this porous material; that these waters now flow in these channels beneath the surface to the land in controversy; that on this land there is a range of hills ex-

tending easterly and westerly, so as to change the course of these underground channels, and combine or collect the water into one general body of water and force the same to turn and move
427 eastwardly in a similar channel through these lands and on down along the general course of the Los Angeles river, that upon arriving at this land a portion of the water rises to the surface and flows above ground as the Los Angeles river, and the remainder flows under ground along in the same general direction, and in connection with the surface stream, in porous material formerly deposited by the same stream in its bed, then all this body of water, both above and below the ground should be deemed a part of the same stream from its sources to its outlet.

XVIII.

If the jury find that on the lands sought to be condemned there is situated the river bottom of the Los Angeles river extending the whole length of said land, and occupying nearly the whole thereof, and containing all of the subterranean waters of said land, and filled to a considerable depth with permeable material, consisting of loam, sand, gravel and boulders mixed together and interspersed with irregular and broken strata, masses or pockets of clay, and cemented sand or gravel, lying in place substantially as deposited by the forces of nature, and that as the same lies in place the natural voids or interstices of such material generally throughout the whole of said river bottom are equal to from one-fifth to one-third of the entire mass; and that the subterranean waters in said lands enter the same chiefly from the north and partly from the west sides thereof from lands composed of substantially the same materials as the lands sought to be condemned, said waters so entering under pressure caused by gravity; and that the south boundary of said river bottom is formed of an impermeable dyke of rock known as the Cahuenga hills; and said waters entering from said north side are
428 prevented from continuing their flow to the south, and are dammed up by said wall of rock, and that all of the subterranean waters in said river bottom are thereby forced to fill all of the said interstices and void places in the material of which said river bottom is composed to a height in some places equal to and in some places greater than the level of the surface stream of the river; and that there are no impenetrable and continuous barriers extending through the said mass in said river bottom in any direction so as to interrupt and prevent the substantial continuity and contact of all of said subterranean waters; and that some of said subterranean waters to the amount of about 1,000 miners' inches constant flow, measured under a four-inch pressure, being so brought to the surface, enter into and form part of the surface stream of the Los Angeles river on said lands, so that the amount of said surface flow at the point where the same leaves said land on the east is increased by about 1,000 inches over the amount of its surface flow at the point where it enters said land on the west; and that the remainder of said subterranean waters move under ground to the east although with a varying velocity and much slower than the

said surface stream but in the same general direction with it, off of the lands sought to be condemned and still continuing in and through the river bottom of the Los Angeles river, which is composed of like permeable material as aforesaid, and bounded and confined on the southerly, as it turns to the south, on the westerly side thereof by the same continuous dyke of rock; said waters still maintaining their substantial continuity; and that part of said waters rise from time to time as they flow in said river bottom and feed the surface flow of said river, and the remainder of said waters, continue to move under ground in said river bottom as aforesaid; and that said waters continue to move in that manner for several miles after
429 leaving the lands sought to be condemned, and until said river bottom enters within the limits of the city of Los Angeles, crossing its northern boundary; then the jury must find that all of the subterranean waters contained in the land sought to be condemned are a part of the waters of the Los Angeles river.

## XIX.

On the other hand, the law is that innumerable little streams finding their way through the soil, or seeping or percolating through the material of which it is composed, do not become water-courses simply because the amount, when exposed, is visible.

A water-course must consist of beds, banks or sides, and water, and the water must be flowing in a channel or course more or less defined. It is not necessary that the water should flow continually, or at all times of the year, but neither is a mere swale, in which extraordinary freshets flow, sufficient to answer the definition. To maintain the right to a water-course or brook, it must be made to appear that the water usually flows in a certain direction, and in a regular channel, with banks or sides, though it need not be in a straight line.

Waters, whether under or above ground, having no certain general course or definite limits, such as those merely percolating through the strata of the earth and those diffused over its surface, are not water-courses, and are not subject to the rules of law applicable to water-courses.

To entitle an underground stream to the consideration of the law, it is necessary that it be a water-course in the proper sense of the term. Percolations which spread themselves in every direction through the earth do not constitute water-courses.

430 Water moving by force of gravity in a valley or basin of wide extent, say 24 by 12 miles at the extreme extent, and moving generally through the whole or through a large portion of the basin, along through the natural voids or interstices of the earth, composed of alluvial or other deposit lying throughout the entire basin, and made up of loam, sand, gravel and boulders mixed together, and interspersed with irregular and broken strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, do not constitute a water-course, but are a part of the land and belong to the owner of the land as fully as any other constituent part of it.

XX.

If you find from the evidence that the lands sought to be condemned are situated at the lower portion of and form a part of the San Fernando basin, or watershed, near or at its outlet, and that said basin is about 24 miles long and about 12 miles wide at the widest point, and that said outlet is from two thousand feet to three miles wide, and bounded and defined on the southern side by the rock of the Cahuenga range and on its northern side by similar rock of the Verdugo hills, and that the earth of which the basin is generally composed, including said outlet and the land sought to be condemned, is an alluvial or other deposit made up of loam, sand, gravel and boulders mixed together and interspersed with broken or irregular strata or masses of clay or cemented sand and gravel and lying in place as originally deposited by the forces of nature and that as the same lies in place, the natural voids or interstices of such earth, generally throughout the basin, including the defendants' lands and said outlet, are equal to from one-fifth to one-third of
431 the bulk of the entire mass, and that such entire deposit lies upon a grade or slope toward and through the outlet of such basin, and that all the water falling in the watershed of said basin, which is not lost in storm run-off or by evaporation or in supporting plant life, or held immovable in the ground, sinks into the earth composing such basin and thence by force of gravity moves down through such voids or natural interstices of the earth throughout the greater portion of the entire mass to the outlet of the basin, through which it passes, without forming anywhere in the mass any definite course or channel in which it can be ascertained with reasonable accuracy that such water is moving in greater quantities or with greater velocity than in other places, so as to be concentrated in a stream either above or below ground, then such waters so moving through such outlet, or through or in defendants' land in the natural voids or interstices of the earth, do not constitute a subterranean flowing stream or water-course, but they belong to the owner of the soil in which they may be found and the portion of them which may be found in the land of the defendants are the property of the defendants. But if such water does collect under ground and flow in certain courses or channels through coarse, permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface and although the space through which the channel extends may be largely filled with the material through which the water flows.

The burden of proving that waters moving in the ground are flowing in a natural water-course or in a defined channel or are a part of a stream, is upon the plaintiff in this action. The
432 presumption is that they are not part of a stream or water-course nor flowing in a definite channel.

XXI.

A stream which flows along and in a natural channel at some places flowing on the surface and at some places sinking in porous material which has been deposited in and has filled the channel, and there passing down along in the same channel under ground and again rising to the surface and flowing as a surface stream, is no less a stream or water-course at the points where it flows under the surface than at the places where it runs on the surface. And if part of the water remains moving under ground at the places where the surface stream flows, all of the water, both above and below the surface, constitutes the stream. And if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material forming the semblance of an underground lake or reservoir with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel and afterwards reappearing below as a surface stream, then the water would be as much a part of the stream while it was contained in such underground lake or widened channel as while it was flowing on the surface.

And, on the other hand, water which has not formed part of such stream and is not moving in such underground channel, but comes from surface water or from rains and floods sinking in the ground and passing through the soil by gravitation, having no general direction, although it may eventually find its way into some stream or water-course and materially add to the water thereof, yet
433 while so passing through the ground it is not a stream or water-course, but is part of the soil and is the property of the owner thereof.

XXII.

In determining the actual value of the land taken, you are to take into consideration all of those factors which enter into and make up its value; the altitude of the tract, the capability of taking to the city of Los Angeles and to the country east and west of it, by gravity, the waters which may be collected on said land without taking the waters of the natural stream; the amount of water which can thus be collected; the fact that the land sought to be condemned is so situated as to constitute the best place along the Los Angeles river for obtaining a water supply and conducting the same either to the city or other tracts east and west of it; the needs of water in different places within the reach of this tract of land and of the water which may be thus collected thereon; all are circumstances to be considered by you in determining its actual value.

XXIII.

If the jury believe from the evidence that the subterranean waters in the land sought to be condemned are percolating without any definite channel, and that the same are not a subterranean water-course or stream, and if they believe that such waters come on to

said lands from the lands of others above, or pass from the lands sought to be condemned down to the lands of others lying below, and that such upper proprietors could, by the construction of tunnels or other works, cut off or divert said waters, or some part thereof, from the lands sought to be condemned, or that such lower proprietors could construct tunnels or other works on the
434 lands lying below the lands sought to be condemned, which would have the effect of draining or depriving the lands sought to be condemned of their subterranean waters, to the extent that the owners of the land sought to be condemned could not make a practical use thereof, or of some part of said waters, then the jury are instructed that such upper and lower proprietors would have the same rights so to appropriate said waters on their lands as the defendants would have on the lands sought to be condemned, and the jury must take those facts into consideration so far as they diminish or destroy the value of the rights of the defendants to said waters, or such portion thereof as could be so diverted or drained so as to deprive defendants of the practical use thereof.

## XXIV.

In estimating the value of the riparian rights of the defendants to utilize the flow of the river for generation of power, you are instructed that the water so used must be both taken from and returned to the river at points situated on the land sought to be condemned; that no speculative valuation can be entertained by you; that you are authorized to take into consideration the cost of constructing and maintaining the works necessary to develop and utilize the power and the difficulty if any of permanently maintaining and operating said works, in view of the location of the lands and the floods and the freshets, if any, to which the flow of water in the river is subject; that such right is subject to the paramount right of the city to use and control the whole of said waters so far as needed for the use of its inhabitants; and that if the jury finds that the actual market value of the naked land at the time of the issuing of the summons was not increased by reason of the
435 existence of this right, they must not take it into account in fixing the amount of compensation.

## XXV.

In determining the actual value at the date of the summons you are not to take, as the measure of that value what an owner could realize at a forced sale, but the price he could obtain after reasonable and ample time, such as would ordinarily be taken by an owner to make sale of like property; and in making that estimate you should consider the use for which the property is suitable, having regard to the existing business or wants of the community, or such as might have been reasonably expected in the immediate future. You will also consider the fitness of this land for agriculture, and its value for that purpose, and for fruit or stock raising, for the timber growing on it, as well as the water which may be in the soil, not a part of the river, and from these and all other uses to which the property

may be put from which profit may be derived, and from all the evidence on the subject, you will determine its actual market value at that date.

XXVI.

The market value of the land is not necessarily the value of the land in its present or prospective use to the owner; nor is it the value which it would be to the city as a location for headworks; nor the sum which the city must be compelled to give for it by reason of the necessity it may be under to obtain it; nor is it the sum that could be derived from the land for any special purpose for which it may be suitable. All these things, if shown by the evidence, may be considered as bearing on the question, but only so far as it may appear that they affect the actual mar-
436 ket value at the date of the summons, and the thing you are to determine is such actual market value at the date stated.

XXVII.

Although you may believe from the evidence that by reason of things done, discovered or ascertained since June 27, 1893, it now appears that the land was then more valuable for any purpose or use than it was then known to be; yet you cannot consider such additional value unless you believe also that these things were sufficiently known or obvious in June, 1893, to affect the market value at that time, and did so affect it.

XXVIII.

If the jury find that any of the underground waters of the lands sought to be condemned are not a part of the waters of the Los Angeles river, they can consider that fact in fixing compensation only so far as it tended, if at all, to affect the actual market value of the land at the date of issuing the summons disregarding any acts done upon the lands or information acquired concerning said waters since said date.

XXXIX.

You are entitled to consider the evidence regarding the quantity of subterranean waters in the lands in question, and their value, only in arriving at a just determination of the market value of the lands sought to be condemned on the 27th day of June, 1893, wherefore, if you believe that said waters did not give said lands an additional market value at that date, or that if an additional market value were given but the same did not equal the real value of said waters, then you must place on said lands a valuation
437 equal only to the market value which they then had, including such additional market value which said waters gave to said lands, irrespective of the true value of said waters.

If, for instance, said lands could not have been sold in the market on said date (the owners having had abundant time to find a purchaser, such as would generally be taken by an owner trying to sell like property), for more than a certain sum, then you must not

find the value of said lands to be greater than said sum, although in fact you may believe that the waters in said lands made them worth more than that sum.

XXX.

If you find from the evidence that the tract sought to be condemned is part of a larger tract belonging to the defendants and that this larger tract will be damaged by the severance from it of the tract sought to be condemned and applying it to the uses proposed, then you must determine the amount which the remainder of the entire tract, the part not taken, will be damaged.

XXXI.

In estimating this damage, you should consider the character and situation of the entire tract and of the portion that will remain to the defendants, the condition in which the severance will leave the remaining land, whether or not the severance will leave the remainder more difficult of access, the uses for which the portion not taken is most valuable, and if you believe that that also contains waters not part of any stream, but which could be collected and carried below for use, and that the effect of putting the part sought to be taken to the proposed use, and the ownership and control
438 thereof by the city would prevent, hinder or make impracticable the collection of such waters, or the carrying or conducting of such waters to other places where they might be used, then this tract is to be considered with all the other circumstances in determining such damage to the part not taken.

XXXII.

From all these considerations, it is your duty to determine what is a reasonable, fair and just compensation to the defendants for their right, title, interest and estate in the property described in the complaint, and sought to be condemned in this action, and what, upon a reasonable, fair and just consideration of the evidence, is the true amount of the damage that will be done to the remaining portion of the defendants' lands, embraced in the same parcel by the severance of it from the portion sought to be condemned, and to return the several amounts in your verdict.

XXXIII.

It is admitted by the plaintiff, and there being no evidence to the contrary, it must be concluded in any event that no benefit will accrue to any property of the defendants by the construction of any improvement proposed to be made by the plaintiff, nor by any diversion, distribution or delivery by the plaintiff of any water included in the land sought to be condemned, and upon this point your verdict will be in accordance with such admission.

XXXIV.

You are the exclusive judges of the weight of the evidence and of the credibility of the witnesses. The court must allow any evi-

dence to be introduced which tends in the slightest degree
439 upon any reasonable theory to establish any material fact in the case. It must be allowed by the court, even if its materiality depends upon the existence upon some other fact which is disputed, and which, if, non-existant, would render the other evidence immaterial. The reason for this is that the court cannot decide any question of fact, bearing upon the issues submitted to you. But your province is to decide all questions of fact, and you are to determine for yourselves what weight you believe should be given to any and every part of the evidence.

## XXXV.

Nine of your number may agree upon and return a verdict without the concurrence of the other three. And whenever you have agreed you will return your verdict into court.

To which said instructions the defendants then and there duly excepted upon the grounds set forth in their specific exceptions, which exceptions so made by defendants were made at the time said instructions were given, and were as follows:

Ex. 30. 3. We except to all that portion of the third instruction after the words "fee-simple" in the second line. That is, to that portion of the instruction in which the jury are instructed that the rights of defendants as riparian owners are subject to the rights of the city of Los Angeles in the waters of the Los Angeles river. And to every portion of said instruction which implies that the rights of the defendants as riparian proprietors are impaired or diminished by any superior rights, upon the ground that the city of Los Angeles has not any superior rights of these defendants as riparian owners.

Ex. 31. 4. We except to the fourth instruction and to every
440 part of it, upon the ground that if the city of Los Angeles has any superior or paramount right as the successor of the pueblo of Los Angeles, that superior or paramount right is confined to the pueblo, and that the city, as against extent of the pueblo, and that the city, as against these defendants, has no paramount rights to the waters of the Los Angeles river to the extent that may be necessary to supply the uses of its inhabitants for municipal uses and purposes for which the city may require water or any municipal uses or purposes beyond those uses and purposes to which it was applied or might have been applied by the pueblo; and within the limits of the pueblo, that the city has not any paramount right to the waters of the Los Angeles river for use on districts of land included within the city boundaries, which are not within the pueblo limits; nor to supply artificial lakes in public parks, nor to maintain and flush an outfall sewer to the sea; that it has no paramount right to take the waters of the river to meet any needs which the growth of the city in the future may require; but, on the contrary, for all such extraordinary uses, and for use beyond the limits of the pueblo, the rights of the city in the waters of the Los Angeles river are not superior to those of the defendants.

Ex. 32. 5. The defendants except to the fifth instruction, and to

every part of it, wherein the jury are instructed that the defendants have no right to use or divert the water of the river so as to diminish the same to such an extent that it will not furnish the amount needed for the supply of the city for the purposes which have been before stated, and that the fact that the defendants had no such right was to be taken into consideration in determining the value of the land taken. We except to that instruction upon the same ground as to the last one mentioned, that the city has no
441 such superior right and no right of the city is impaired by the use of the waters by these defendants.

Ex. 33. 6. The defendants except to so much of the sixth instruction as implies that the defendants have not the right to use the waters of the river on their land for any and for every lawful purpose until after the wants of the city are supplied, as such wants had been before defined upon the ground that said portions of the instruction is not law, and that the rights of these defendants are not subject to any paramount right of the city to use the water outside of the limits of the pueblo, or for such purposes as maintaining artificial lakes or sprinkling streets or maintaining or flushing outfall sewers to the sea.

Ex. 34. 8. The defendants except to the eighth instruction defining the rights of owners in lands and subterranean water-courses upon the ground that there is no evidence in this case, proving or tending to prove that there is any such subterranean water-course or stream in the lands of these defendants, and therefore no evidence to which said instruction is applicable.

Ex. 35. 9. The defendants except to that portion of the ninth instruction wherein the jury are instructed that the owners of lands through which the natural water-course or surface or subterranean stream flows, cannot by digging in his own soil, collect and divert the percolating waters, because such percolating waters may find their way into such water-course, or where the effect would be to cause any of the running waters of the stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn by such excavation, any more than if said excavation was made so as to tap said stream directly,
442 because, first, said instruction is not law, as the owners of the lands through which waters are percolating ha- the right to collect the same and to make any beneficial use of them, without regard to its effect upon the stream or springs or wells in his neighbor's land; and, secondly, there is no evidence in this case to which it is applicable. There is no evidence in this case tending to show that the effect of taking the water in this land would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn, any more than if said excavation was made so as to tap said stream directly or that it would have that effect at all.

Ex. 36. 10. The defendants except to the tenth instruction, and every part of it, because the same is erroneous in this: First, that the owner has the right to the percolating waters on his land,

whether they eventually percolate into some spring or stream, or not; and more especially where they are lost before reaching the point where they would have gone into or made up a part of the surface, or subterranean stream, in this case, the Los Angeles river.

And, secondly, because the said instruction is contradictory in this: It assumes in one part that the water is lost before it gets into or makes up a part of the surface or subterranean stream of the Los Angeles river, and in another that it enters the same at some point above the city boundary of the pueblo lands of the city of Los Angeles.

And upon the further ground, that the instruction is inapplicable, because there is no evidence that there are any pueblo lands of the city of Los Angeles at any point to be affected by such diversion, and no evidence that the percolating waters would be gathered into the Los Angeles river at any point.

443 Ex. 37. 11. The defendants except to that part of the eleventh instruction lim-ting the rights of these defendants to the additional market value of the land accruing by reason of the rights and advantages there referred to, the limitation being that they are so entitled to such additional damage so far as they do not interfere with or impair the rights of the city aforesaid; because, first, the defendants are entitled to that additional value pertaining to the said lands by reason of the presence of the percolating waters; and, that the ownership thereof or the development and use of the same do not impair any right of the city.

And, secondly, the said instruction is uncertain, because it does not appear that the rights of the city would be impaired by reason of those rights, and advantages referred to in said instruction.

Ex. 38. 14. The defendants except to the fourteenth instruction wherein it is said that the Los Angeles river is composed of its main stream and any branches it may have, whether surface or subterranean. The part we except to is "or subterranean," because there is no evidence that there are any subterranean branches of the Los Angeles river, or any subterranean streams at all.

Ex. 39. 15. We except to the fifteenth instruction, defining a water-course; to that part of it wherein it is said that such bed may consist of any material which keeps the waters from penetrating below a certain depth, on the ground that it is not an element of the definition of a water-course, the character of the material, nor the depth to which the waters are prevented from penetrating.

Ex. 40. 16. The defendants except to the sixteenth instruction and every part of it, first, because it does not correctly define a water-course.

444 Secondly, that, in so far as it is declared that the water need not flow in a defined channel under ground as a solid body of moving water of any particular dimensions in order to constitute a water-course, it is erroneous.

And that part of the instruction where the jury are told if they find that there is a bed or river bottom filled to a considerable depth with sand, gravel or other porous material, meandering over which a stream runs on the surface, and through and in which the

water moves under ground, enough of it rising to the surface to supply the surface stream, and the other portions of the underground water moving with a much less velocity than the surface stream, and through a wider or larger space, in and through the interstices of the porous material, but in the same general direction as the surface stream, and in connection with it, and in a course, and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy; then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface—that portion of the instruction is erroneous, because from the conditions and facts stated in the said instruction, the conclusion that they are to be taken as a part of the waters of the water-course is neither a legal conclusion, nor does it follow as an inference of fact; but, on the contrary, from the facts stated, the conclusion should be that the waters are percolating and are not a water-course.

And, furthermore, because the statement does not contain a statement of all the facts proven in this case upon which the conclusion as to whether the waters are percolating waters or a water-course is to be reached.

445 And, furthermore, because it is a charge to the jury upon a matter of fact.

The latter part of the instruction, that if such water-course exists it is immaterial, so far as the water-course is concerned, from or through what lands the water-flow in reaching the channel, or whether they reach the same by percolation or by clearly defined stream, is erroneous, for the reason it cannot be determined what is meant by a water-course and what by percolating waters, or what by a clearly defined stream; and that, from the previous part of the instruction, the jury may infer that water moving in any way may be a water-course or a clearly defined stream or percolation.

Ex. 41. 17. The defendants except to the seventeenth instruction for the reason that the same is a charge to the jury upon a matter of fact; that the instruction does not contain all the facts upon which the conclusion that the jury are directed to reach from the finding of those facts would depend; and further that the conclusion directly named, that they should find that the waters both above and below ground, following under the conditions there stated should be deemed a part of the same stream from its sources to its outlet, is not warranted by the facts stated; but, on the contrary, the facts state the waters are percolating waters and are not a water-course and do not belong to the Los Angeles river.

And, furthermore, the conditions assumed in the said seventeenth instruction, as to the waters flowing under ground, are not proven, nor was there any evidence tending to prove them, nor to prove the facts therein stated; and, among other things, there is no evidence that anything does occur to change the course of the underground channels or to combine or collect the water into one general body

of water, or force the same to turn and move easterly in a
446 similar channel through those lands and on down the general course of the Los Angeles river.

Ex. 42. 18. The defendants except to the eighteenth instruction for the reason that under the facts therein stated, the waters therein referred to, except those which rise to the surface and flow in the channel, are percolating waters, and the subterranean waters flowing under the conditions there mentioned are percolating waters, and belong to the owners of the soil, namely, these defendants; or, at least, that part of it which flows through their lands; and they are not a part of the waters of the Los Angeles river so as to be governed by the laws applicable to water-courses.

For the further reason that the said instruction is a charge to the jury upon matters of fact; and for the further reason that the said instruction does not contain a statement of all the facts upon which the conclusion the jury are directed to draw depends.

Ex. 43. 16, 17, 18. And the defendants further except to the sixteenth, seventeenth and eighteenth instructions upon the ground that they are inconsistent with each other; and, furthermore, they except to each one of the said instructions upon the ground that each is inconsistent with the nineteenth and with the twentieth instruction.

Defendants further except to the sixteenth, seventeenth and eighteenth instructions, and each of them, because neither one of them, nor all of them combined, correctly define percolating waters or natural water-courses.

Ex. 44. 18. And, further excepting to the eighteenth instruction, and to that part of it wherein it is said that the said waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom
447 enters within the limits of the city of Los Angeles, crossing its northern boundary—that the fact which it is there assumed that the jury may find is one in support of which there is no evidence.

Ex. 45. 20. The defendants except to that portion of the twentieth instruction wherein the court says "but if such waters does collect under ground and flow in certain courses or channels through coarse permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface, and although the space through which the channel extends may be largely filled with the material through which the water flows," on the ground there is no evidence to which the said portion of the instruction is applicable, and no evidence that such water does collect under ground and flow in certain courses or channels through any kind of material.

Ex. 46. 21. The defendants except to the twenty-first instruction, and to the whole of it, upon the following grounds: That there is no evidence that the Los Angeles river, from the time it first appears on the surface a few miles above the tract of land in contro-

versy does, at any place for miles above the northern boundary of the city, sink in porous material, or that it passes down along in the same channel under ground, or rises again to the surface, or flows as a surface stream; and there is no evidence to justify that portion of the instruction that, under the facts there stated—that is, where it flows in a channel under ground and rises again—it is no less a stream and water-course at the point where it flows under the surface than at the place where it runs on the surface. The evi-
448 dence in the case shows that, from the time the Los Angeles river first makes its appearance on the surface, it never does sink again until after it enters the city of Los Angeles.

The defendants except also to that part of the twenty-first instruction wherein it is declared, after the facts there stated, that if a part of the water remains moving under ground at the places where the surface stream flows, all of the water both above and below the surface, constitutes the stream, upon the ground that it is inapplicable to the evidence in the case, or else is not correct as a matter of law. The evidence shows that the waters move through the entire San Fernando valley, for a width from—above the tract of land in controversy—varying from two miles to six or eight miles; that the water is flowing in every part of it; that the underground flow is not of waters flowing immediately beneath the bed of the surface of the river.

Further, there is no evidence to warrant the instruction that, if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material, forming the semblance of an underground lake or reservoir, with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel, and afterwards reappearing below, as a surface stream, then the water would be as much a part of the stream while it was contained in such underground lake or widened channel as while it was flowing on the surface, because there is no evidence to which that portion of instruction is applicable.

Ex. 47. 23. The defendants except to the twenty-third instruction, because there is no evidence to which it is applicable, and all of the evidence upon the subject of the control of the under-
449 ground flow is that the lands of these defendants hold the control of the situation; and is, besides, directing the jury that they may speculate upon the intentions and actions of others. That instruction is the one where the jury are directed that they may take into consideration the effect that the excavations of others, upon other lands not belonging to these defendants, might have upon the percolating waters in the lands of the defendants by diverting them away from those lands. There is no evidence in the case tending to show that any such effect would follow, and the jury are thereby permitted to speculate upon what some persons may do in the future as affecting the value of the lands sought to be taken now.

Ex. 48. 24. Defendants except to the twenty-fourth instruction, wherein the jury are directed that the rights of these defendants to

the water power on their lands are subject to the paramount right of the city to use and control the whole of said waters so far as needed for the use of its inhabitants, for the reason that the city has no such paramount right; and, furthermore, there is no evidence that such use of the water for water power would or could in any manner affect the city, either in its paramount, equal or subordinate rights.

Ex. 49. 25. The defendants except to that portion of the twenty-fifth instruction wherein the jury are directed, from all the evidence, to determine the actual value of the land at the date of the issuance of the summons, for the reason that the said instruction is erroneous because the defendants are entitled to the actual value of that date.

Ex. 50. 26. The defendants except to the twenty-sixth instruction, first, because it is erroneous in making the market value
450 of the land the test of the amount of compensation to which the defendants are entitled.

Second, because there is no evidence warranting an instruction that the jury were not to consider the value as the sum which the city might be compelled to give for it, by reason of the necessity it might be under to obtain it, because there is no evidence that there was any such necessity.

And for the reason that the instruction that the value which it would be to the city as a location for headworks, was not to be taken by the jury, is erroneous, that its value for the location of headworks whether by the city or any one else, by reason of its situation is an element of the value.

And that portion of the instruction where the jury were instructed that the market value is not the sum that could be derived from the land for any special purpose for which it may be suitable, is incorrect in law, and the instruction is erroneous in that it makes the market value instead of the actual value the test of the amount of compensation.

Ex. 51. 27. The defendants except to the twenty-seventy instruction for the reasons last above stated; that the market value is not the measure of compensation to which defendants are entitled.

And upon the further ground, that the existence of the water percolating in this land—that the assumption that the jury might find that the existence of the waters percolating in this land was not known at the time of the issuance of the summons, is not supported by any evidence; nor is there any evidence to which any instruction that any value which it possessed was not then known or could be considered, could apply, because there was no evidence that the land possessed any element of value which was not then known.

451 Ex. 52. 28. The defendants except to the twenty-eighth instruction for the same reason, namely, first, that the market value is taken as the measure of compensation instead of the actual value; and, second, in assuming that there was any information acquired concerning the percolating waters since the date of the issuance of the summons. The evidence shows that the lands always bore unmistakable evidence of the existence of the waters,

and the subsequent development and excavations and investigations have only confirmed that knowledge.

Ex. 53. 29. The defendants except to the twenty-ninth instruction, so far as the market value is made the measure of compensation instead of the actual value.

And they except to that portion of the instruction where the jury are told that, if they believe that said waters did not give said land an additional market value at that day—that is, the date of the issuance of the summons—or that if an additional market value were given, but the same did not equal the real value of said waters, then they must place on said lands a valuation equal only to the market value which they then had, including such additional market value which said waters gave to said lands irrespective of the true value of said waters, for the reason above stated; and for the further reason that there is no evidence to which it is applicable, and is a direction to the jury to speculate upon matters which there is no evidence to justify.

And the defendants except to the remainder of the instruction for the same reason.

Ex. 54. The defendants also except to every instruction wherein it is assumed or stated that the market value is the test of the compensation or that the value at the date of the issuance of the summons is the measure of their right to recover.

452 Ex. 55. 32. Defendants except to the thirty-second instruction, wherein the jury are told that it is their duty to determine what is the reasonable, fair and just compensation to the defendants for their right, title, interest and estate in the property sought to be condemned, in so far as such instruction implies that the right, title, interest and estate is anything less than the fee-simple.

In excepting to the instructions upon the ground that the date of the summons cannot be fixed as the measure of the compensation, our exception is based upon the reason that the statute which undertakes to fix the date of the issuance of the summons in any case as the measure of compensation for the land sought to be taken, is in violation of the constitution, and especially in a case where, as in this case, the summons was not served for nearly a year after the action was commenced.

The annexed exhibits are copies of the originals introduced in evidence by the party whose exhibits they purport to be, and are those referred to by the witnesses in their testimony.

And after the cause has been argued by the counsel and submitted to the jury upon the evidence and the instructions, the jury returned a verdict, and the court, on the same day and after the verdict had been returned, signed and filed its findings of fact in the case, and to which said verdict and the said findings of fact, the defendants then and there duly excepted:

I.

The defendants except to the second finding of the court, with regard to paragraph III of the last amended complaint, wherein

the court found that the plaintiff is, and ever since its organization has been, the owner in fee-simple of the paramount right to the use of all the waters of the Los Angeles river, described in said
453 complaint, from its sources to the boundary of the city, so far as may be needed from time to time, and in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, and of supplying water for irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of plaintiff, and for all other municipal and public uses and purposes in said city, upon the ground that the evidence is insufficient to sustain the said finding in this:

(1.) That the evidence showed that the lands claimed by the defendants lie within three tracts of land, which have been granted in three separate grants by the Mexican government, prior to the acquisition of the State of California by the American government; that these grants have been confirmed by the proper authorities, and United States patents have issued therefor; and that these defendants claim the lands sought to be condemned, under the said Mexican grants and United States patents, and each of them, and that the Los Angeles river flows through the tracts of land sought to be condemned, and through each of the said Mexican grants, and through a portion of each of the said grants included within the lands here sought to be condemned; and there was no evidence proving, or tending to prove, that there was any exception out of, or reservation from, the said Mexican grants, or United States patents, or any deed under which the defendants claim the said lands, nor any limitation upon the estate granted, but that the said Mexican grants and United States patents and deeds, under which the defendants claim the title to the said property, did, each of them, convey the fee-simple title, with all the rights to the waters flowing upon the surface of the ground, or percolating in the soil, that passed by said grants, and there was no evidence proving, or tending to prove, any limitation upon such title.

454 (2.) There was no evidence proving, or tending to prove, that Los Angeles was a Spanish or Mexican pueblo at the date that either of the said grants, to wit, of the Providencia, Cahuenga or San Rafael ranchos, were made by the Mexican government.

(3.) There was no evidence proving, or tending to prove, that the city of Los Angeles had acquired any right, title or interest in the waters of the Los Angeles river, flowing through the said tract of land belonging to these defendants, or to the waters percolating in the soil thereof, unless such right, title or interest accrued to the said city of Los Angeles under the claim of the said city made to the board of land commissioners to settle private land claims in California, and the patent of the United States issued to the said city; and there was no evidence proving, or tending to prove, that any such grant by the said patent, or by the Mexican grants, unless such right is annexed thereto by virtue of the laws of Mexico or Spain or of the United States, without any express mention of said rights; and defendants say that no such right accrues to the said

city of Los Angeles by virtue of any Mexican grant or United States patent, or otherwise, either to the waters flowing in the Los Angeles river, or the waters percolating in the said soil.

(4.) There was no evidence proving, or tending to prove, that the city of Los Angeles was entitled to the use of the waters for supplying the inhabitants of the said city; but, on the contrary, the evidence showed that the city included within its boundaries large tracts of land which were settled upon by numerous persons, and which were outside of the limits of the lines of the patent by the United States to the said city of Los Angeles under its claim of title from the Mexican government; and the evidence further
455 showed that the uses of water by the city of Los Angeles were applied to innumerable purposes not embraced within the uses and purposes to which the water could be used under any Spanish or Mexican law or grant.

II.

Defendants except to the III finding, in so far as by the said third finding the rights of these defendants, as riparian proprietors, are found to be subordinate to the said city, upon the ground that the same is not sustained by the evidence, and the defendants make the same specifications wherein the evidence is insufficient to support the III finding, as are made in the specification of insufficiency of the evidence to sustain the II finding.

III.

The defendants except to the first finding, namely, that all of the allegations of the last amended complaint, except paragraph III thereof, are true, upon the ground, among others, that the evidence is insufficient to support the said finding, and specify the following particulars wherein the evidence is insufficient to support the said finding:

(1.) The evidence is insufficient to support the finding that the Los Angeles river is fed by springs which rise to the surface in or along the said river, which is contained in paragraph II of said amended complaint.

(2.) The evidence is insufficient to justify the finding that the bed of said river, from its sources to the norther- boundary of said city, is composed of sandy soil, or that the water sinks readily, and forms subterranean streams, flowing in well-defined channels beneath said bed, or that said subterranean water rises to the surface in
456 various places before reaching the said city, and becomes a part of the surface water of said river. There was no evidence whatever proving, or tending to prove, that there were any subterranean streams in the lands of the defendants, or in the San Fernando basin above, flowing in well, or any, defined channels beneath the said bed; but, on the contrary, the evidence showed that the subterranean waters in the said San Fernando basin, and especially in the lands of these defendants, are waters percolating through the soil.

The defendants further except to the said finding upon the ground

that the said issue as to the character of the subterranean waters was not submitted to the court, nor tried before the court.

(3.) The evidence is insufficient to justify the finding, contained in the IV paragraph of the complaint, that plaintiff had, within one year of, and prior to, the commencement of this action, taken measures to inaugurate a plan and system of water works, by means of which to divert the water of said river; but, on the contrary, there was no evidence proving, or tending to prove, that the city had inaugurated any plant or system prior to the commencement of this action for the purposes mentioned therein, or that any such plan or system included the acquisition of the lands of these defendants sought to be condemned.

(4.) The evidence is insufficient to justify the finding, that the ordinance, mentioned in paragraph V of the complaint, was passed or had any effect, before the commencement of this action; but, on the contrary, the evidence showed that it never went into effect until after the action was commenced, and did not take effect until it was published.

457 (5.) The evidence is insufficient to justify that portion of the said finding, that finds the allegations of paragraph VI of the said amended complaint to be true, because there was no evidence tending to prove that the greater part of the Los Angeles river flowing on the surface below and to the east of the lands of defendants, come into said river beneath the surface at points adjoining the northern line of the lands of the defendants.

(6.) There was no evidence proving, or tending to prove, that the surface water of the river at all or any points above or below the lands of the defendants, was polluted to such an extent as to render it liable to injure the health of the inhabitants of said city, if used by them for domestic purposes, or that it is polluted to any extent, as alleged in the said paragraph VI of the complaint.

(7.) There is no evidence proving, or tending to prove, that all the water flowing in the lands of the defendants will, at any time in the near future, be needed for furnishing the city, or its inhabitants, with water for any purpose; but, on the contrary, the evidence showed that a greater amount of water was now being supplied to the city than is found in the surface flow upon the lands of the defendants.

(8.) There was no evidence proving, or tending to prove, that the construction of the said works in the lands of the defendants, for the development of waters therein, would involve an expenditure by the city of several hundred thousand dollars. The works projected by the city that would cost several hundred thousand dollars, was the system of pipes to be laid inside the city limits.

(9.) The evidence was insufficient to justify the finding that it was impossible to determine in advance of the construction

458 of the same, the places where the tunnels, filtration galleries, settling reservoirs or basins, or collecting chambers, other than those delineated on the map, should be constructed, or that it might not be necessary, in the construction of the works, to use all or any portion of the said lands. On the contrary, the evidence

showed there was no difficulty in determining the character or extent of the works, nor where they should be located, nor the cost of the same.

(10.) The evidence was insufficient to prove that it is necessary to take the whole of said lands for any purposes, and no authority was shown for taking the said lands, or any portion of them; and defendants further say, as to the finding that the taking of the whole three hundred and fourteen acres was necessary, that there was no purpose mentioned in the complaint for which the property was to be taken; that there was any authority to condemn a fee-simple for at all, except the mere construction of a submerged dam, and that, as to that, the evidence showed it would not require ten acres.

(11.) The evidence is insufficient to justify the finding that the river did, from year to year, shift or materially change its course on the lands sought to be condemned, as alleged in the said paragraph VI, of the said amended complaint, and there was no evidence proving, or tending to prove, that any such shifting of the river bed had occurred in the last twenty years, nor any evidence that any ever had occurred that was at all material, or would affect the proposed works; and there was no evidence proving, or tending to prove, the necessity for taking the said lands at all, or any authority to take them for the purposes aforesaid; and no necessity for acquiring the fee-simple title to the whole of the said lands, and no authority for acquiring the fee-simple for any portion thereof, except the submerged dam.

459 (12.) There was no evidence proving, or tending to prove, that the public interest or necessity of the city demanded the construction of the said system of water works on said lands, sought to be condemned, or that, in order to properly construct or maintain the same, it was necessary that the whole of said lands should be condemned in fee-simple for the use of plaintiff.

(13.) The evidence is insufficient to justify the finding that the facts alleged in paragraph VIII of the said amended complaint were true, and especially there was no evidence proving, or tending to prove, that the defendant, J. D. Hooker, was the owner of any of said lands subject to the alleged rights of plaintiff in said waters of said Los Angeles river, or to prove that the plaintiff had any such rights.

And the defendants except to the verdict of the jury upon the ground that the decision is against law.

And the time being duly extended for preparing and serving the foregoing bill of exceptions, the defendants now ask that the same be settled and certified as correct.

At the time of the settlement of the foregoing bill of exceptions and of the follo-ing annexed statement on motion for new trial, the following stipulation was duly entered into between the attorneys for the respective parties:

It is hereby stipulated between the parties to this action, that upon an appeal to the supreme court from the judgment in the cause or from an order granting or denying a new trial, the bill of exceptions and the statement on motion for a new trial, may both

be used as a part of the record on such appeal from either, that is to say, the defendants on the appeal from the judgment may
460 make use of any part of the statement on motion for a new trial in the argument of any question raised on the exceptions contained in the bill of exceptions, and, in like manner, the plaintiff may make use of any part of the said statement on motion for a new trial, as part of the record on appeal from the judgment, that may go to support their contentions upon the said questions raised in the bill of exceptions; and, in like manner upon an appeal by the defendants from an order denying, or upon an appeal by the plaintiff from an order granting a motion for a new trial, the bill of exceptions shall be considered as a part of the record on appeal from such order, and may be used by either party in like manner as if incorporated into the statement.

It is further stipulated that the maps and profiles made exhibits in the cause, may be bound together and attached to or connected with the bill of exceptions or statement on motion for a new trial in their numerical order, and that one set shall be attached to or connected with the original statement and bill of exceptions in the superior court, and attached to — connected with one transcript of the record on appeal in the supreme court; and, with the exception of said one copy of the transcript of the record on appeal in the supreme court, the said maps and exhibits need not be attached together but may be brought together in portfolio or other convenient form of confining them, and six copies, besides the original, furnished the supreme court, and one given to the attorneys for the plaintiff. That in printing the transcript the said exhibits need not be inserted into their proper places in the printed transcript, but may, as above stipulated, be annexed together and attached to the transcript, the said maps, many of them being so large that it is impossible to put them together in a printed transcript and bind them.

461 This stipulation, it is agreed, may be inserted into and become a part of the statement on a motion for a new trial, and shall be deemed to be also inserted in and made a part of the bill of exceptions, so that the said stipulation may be referred to on appeal either from the order granting or denying the new trial, or the judgment; and also on the motion for new trial in superior court.

Said bill of exceptions and statement on motion for new trial shall be attached together and be considered as one document for all the purposes referred to herein.

It is also stipulated that all photographs introduced in evidence may be omitted from the statement and bill.

The foregoing bill of exceptions consisting of the matter therein contained and of the matters in the following annexed statement on motion for new trial incorporated in said bill by the foregoing stipulation is hereby settled and allowed and certified to be correct.

Dated this March 25th, 1897.

LUCIEN SHAW,
*Judge of the Superior Court.*

Endorsed: Filed Mar. 25, 1897. T. E. Newlin, clerk; by Sherman Smith, deputy clerk.

462 In the Superior Court of the County of Los Angeles, State of California.

THE CITY OF LOS ANGELES (a Municipal Corporation), Plaintiff,
*vs.*
A. E. POMEROY and J. D. HOOKER, Defendants.
No. 19680. Dep't No. 5.

*Defendants' Proposed Statement on Motion for a New Trial.*

The defendants in this action before the commencement of the trial, which was on the 28th of February, 1896, moved the court to continue the trial of the action until the issues of the title to the property, between the plaintiff and the defendants, had been tried and determined, upon the ground that the court had no jurisdiction in this proceeding, to determine controverted questions
463 of title between the plaintiff and defendants, and other grounds set forth in the notice of motion, as will appear in the bill of exceptions to the ruling of the court, already filed, and the said motion was denied; and afterwards the cause came on for trial, defendants, without waiving the objections to the jurisdiction of the court to proceed at all to determine questions of title in this action, stipulated to proceed with the trial of the title before the judge; and thereupon the trial commenced before the judge and upon the questions of title of Los Angeles city to the waters of the Los Angeles river, and the following proceedings were had and evidence taken:

The counsel for the plaintiff offered in evidence a portion of the eighth paragraph of the answer, which said portion was as follows:

"The defendants aver that the said waters have been used by the said plaintiff for one hundred years and more, and without detriment to the health of the people, and used for the said domestic purposes, as well as all other purposes." The defendants objected to that portion of the answer of the defendants, as evidence for the plaintiff, upon the ground that it was incompetent, and the court overruled the objection and the defendants excepted.

The plaintiff next offered in evidence a part of paragraph XII of the answer, which was as follows:

"That the altitude of said tracts was such that the said water would flow into the city of Los Angeles, upon the elevated portions thereof by gravity, as well as to flow to other sections of the country to supply the land outside of the city with water for irrigation and domestic purposes and uses;" and which said paragraph was read as evidence and thereupon the counsel for the defendants moved to strike out the first paragraph read upon the ground that it appeared from the reading of it that the whole clause in reference to
464 the matters therein stated was not read, and that the whole was necessary to the understanding of the meaning of that

which was read, and thereupon it was stipulated that the whole of paragraph VIII and XII of the answer should be considered as read in evidence by the plaintiff.

Plaintiff then introduced in evidence the two patents to the city of Los Angeles set out in foregoing bill of exceptions.

The plaintiff then introduced in evidence the following statutes of the legislature of the State of California, to wit: "An act to incorporate the city of Los Angeles," passed April 4th, 1850, (Statutes of 1850, page 155;) "An act supplementary to 'An act to incorporate the city of Los Angeles,' passed April fourth, one thousand eight hundred and fifty," approved May 1st, 1852, (Statutes of 1852, page 186;) "An act explanatory of an act entitled, 'An act to incorporate the city of Los Angeles,' approved April 4, 1850," passed April 13, 1854, (Statutes of 1854, page 205;) "An act to promote irrigation in the county of Los Angeles," approved March 10, 1874, (Statutes of 1873–'4, page 312;) "An act to amend the charter of the city of Los Angeles, to define its limits and rights, to enlarge its powers, and provide for its more efficient government," approved March 26, 1874, (Statutes of 1873–'4, page 633;) "An act to revise an act entitled, 'An act to amend the charter of the city of Los Angeles, to define its limits and rights, to enlarge its powers, and provide for its more efficient government,' approved March 26, A. D., 1874"—approved April 1, 1876, (Statutes of 1875–'6, page 692;) "An act to amend an act entitled, 'An act to revise an act to amend the charter of the city of Los Angeles, to define its limits and rights, to enlarge its powers, and provide for its more efficient government,' approved April 1st, 1876"—approved March 30, 1878, (Statutes 1877–'8;)

"joint resolution approving the charter of the city of Los An-
465 geles, in Los Angeles county, California, voted for and ratified by the qualified electors of said city, at a special election held therein for that purpose, the 20th day of October, 1888," adopted January 31, 1889 (Statutes of 1889, pages 455–512.)

The defendants objected to the introduction of the statutes upon the ground that they were incompetent, irrelevant and immaterial and unconstitutional.

The COURT, to the said objection, said: I do not see how the statutes are evidence at all. The court takes judicial notice of the statautes. They may be pertinent, perhaps, to show the city is the successor of the ancient pueblo. I cannot see any other purpose they are competent for.

Mr. CHAPMAN, of counsel for the defendants: In so far as they are law, the court takes notice of them without their being introduced. In so far as they are anything else, they are simply nothing.

The COURT: Well I admit them only for the purpose of showing the succession of the present city of Los Angeles to the former pueblo under the Spanish and Mexican governments. To which ruling the defendants duly excepted, upon the ground that they were not admissible for the purpose for which the court admits them, and thereupon said statutes were all introduced in evidence.

The plaintiff introduced in evidence, the deed from Griffith Jen-

kins Griffith, dated the 30th day of August, 1884, recorded in Book 131 of Deeds, at page 19, which was a grant by Griffith Jenkins Griffith, then the owner of a portion of the Los Feliz rancho, of certain water rights and a right of way over the Los Feliz rancho.

Plaintiff introduced in evidence also an agreement to convey, executed by Griffith Jenkins Griffith to the city of Los Angeles dated August 30th, 1884, and recorded in Book 130 of Deeds, at page 125;

also a deed of trust from Griffith, Hellman and Spence to the
466 city of Los Angeles, recorded in Book 130 of Deeds, page 129.

Also a deed from Hellman and Spence, trustees, and Griffith Jenkins Griffith, to the city of Los Angeles, dated the 19th of August, 1885, recorded in Book 144 of Deeds, at page 629.

Plaintiff introduced in evidence a map, a copy of which is annexed hereto and marked "Plaintiff's Exhibit 1*a*."

An extract from the said deed last mentioned is set forth in preceding bill of exceptions.

The deed of date the 30th of August, 1884, recorded in Book 131 of Deeds, page 19, from Griffith Jenkins Griffith to the City of Los Angeles was, as set forth in the foregoing bill of exceptions.

And the counsel for the plaintiff here stated to the court that that is the deed to the first half of the waters of the Los Feliz rancho, or claim they might have in the river. And at the time the city took the contract for the other half, and took a deed for the fifty-foot right of way clear across the rancho. The contract was fulfilled and all these reservations released by the owners of the rancho upon the fulfillment of the contract, and the purchase of the other five-tenths. The two deeds conveyed all the right, without any reservations, except those contained in the final deed.

The defendants here admitted that Griffith Jenkins Griffith had, at the time, the title derived from the United States patents of the Los Feliz rancho, to that portion of the Los Feliz rancho described in the deed.

It was stipulated also that the Los Feliz rancho, which had been granted by the Mexican government and the grant confirmed by the United States, and for which the said patent had issued, fronted upon the Los Angeles river for a considerable distance; and that it extended from the north boundary of the city to the south or east boundary of the Providencia rancho; that the rancho comes down

to the north boundary of the city, as it exists, independent of
467 a recent addition that has been made to the city, but it does

not follow the line of the river all the way down. There is a small tract at the southeast corner of the Los Feliz rancho that does not border on the Los Angeles river, and in several places north of there the rancho extends across the river. Its upper boundary, on the west, was the San Rafael and the Providencia ranchos. The three ranches corner together.

Plaintiff then introduced in evidence the record in case No. 4303, of the superior court, entitled "The City of Los Angeles against Griffith Jenkins Griffith." The complaint was filed August 18th, 1885, and was in the ordinary form to quiet title. It alleged that the plaintiff is, and for a long time hitherto has been, a municipal

corporation, and the owner and in possession of the Los Angeles river, and entitled to the full and free use and enjoyment of all waters flowing in said river, and in all the ditches con-ecting with said river, and the springs and sources from whence the waters flowing in said river are derived; and the full, free and exclusive use of all the waters in said river, and the right to regulate and control the distribution of the same. That the defendant claims an interest adverse to the plaintiff, and so on, and praying that the title of the plaintiff be quieted. Neither the defendants, nor any one interested in their lands, was a party to the action. A judgment was given, adjudging the plaintiff owner of the property described in the complaint, which judgment was entered upon a disclaimer filed by the defendant Griffith Jenkins Griffith, on August 19th, 1885.

The plaintiff called BURR BASSELL as a witness, who, being duly sworn, testified that he was a civil engineer; been engaged in the practice of that profession for more than ten years. Was familiar with the Los Angeles river and the land sought to be condemned, and continuing, testified in substance as follows: Have acquired prac-
468 tical knowledge of the land and river by actual surveys upon the ground, mainly made for the city; began in the year 1891 or 1892; worked two years for them at that time on the proposed headworks, under Mr. Dockweiler's administration. Did most of the actual work of preparing the general scheme for these headworks. The land is about 190 feet in elevation above the plaza, and is the most available location for the purpose of these headworks, than any point below at a less elevation. This particular land was recommended because of its favorable situation, in the neck of the valley there, being the key, as it were, to the waters of the Los Angeles river and its underflow, and the size or territory was selected such as to be ample for the present and future needs of the city, based upon investigations of the amount of land required for certain tunnels and galleries and drainage pipes. That estimate based partly on the experience at Crystal springs, partly on the investigations upon the ground itself and largely from the experience gained elsewhere. The main tunnel is laid as it is to be a main gathering way for laterals that may run into it extending across the territory to be condemned, and is for the conveyance of the subterranean waters as well as the surface waters. The laterals are to intercept the subterranean waters and to conduct them into the main tunnel line. The tract sought to be condemned was made of the length and width that it is in that peculiar shape because in the first place the tract extends along the visible stream of the Los Angeles river, from the hills on the south to the mesa bluff on the north, in general, and from that line between the Providencia and Los Feliz ranchos, as far west, or up the river, as we thought necessary or desirable to condemn. The line follows in a general way the mesa bluffs on the two sides. On the south the bluff is high, precipitous hills, composed of granite and sandstone formation, in
469 some places; quite rough and precipitous and forming a natural barrier to water on the south side all along. On the north

the bluff is an alluvial deposit of disintegrated granite and sand, leading down to the bluff which has been eroded or cut away from time to time by the flood waters of the river. The object of taking the water from the underflow, instead of the surface, *is is*, in the first place, the natural filtration of the water is better than the surface water, which is more or less contaminated with the decaying organic matters which grow in the low marshy lands, and also from any foreign pollution that may occur on the surface such as hog pens or sewerage from any private dwellings, or from anything of that kind. The object sought to be obtained in embracing this whole territory within the territory sought to be condemned is to keep as pure as possible by preventing any contamination at the point where we divert the water. That is one object. At the present time there is a large portion of the land covered with a dense growth of weeds, tules and decaying organic matter, which oughtn't to be permitted; and there is also hog ranges on and adjacent to this land, which pollute the waters. Stock is also allowed to run over the land. If the city had simply a right of way where these galleries are and private parties were owning and using the land as they saw fit, outside these narrow rights of way, there would be some difficulty possibly in compelling private parties to refrain from polluting the headworks.

What the result of the ordinary uses of the land for farming or stock-raising in and about and adjoining and over these pipes or chambers, supposed to be laid, would be, would depend upon what uses these lands were put to. If you kept hogs it would certainly be detrimental. It is not possible to tell the exact number of galleries, filtration galleries, necessary for the uses of the
470 city, because until those galleries are actually constructed it is not possible to tell exactly how much they will yield, and then, too, as the city grows its supply or demand will be greater and they will need to be extended from time to time to conform to the growth and needs of the city. A filtration gallery is simply a tunnel constructed so as to allow the waters from the outside to flow in, the benefit being the natural filter through the galleries and sand. The natural filtration of the water is better than the artificial. It would be almost impossible at the present time to exactly locate the number and the points where the filtration galleries would be necessary, because engineers might differ as to which would be the most economical and the best places to locate a gallery. On parts of this land sought to be condemned, the river shifts its channel from time to time, somewhat depending on the floods. And in case the channel of the river shifts, it might be desirable to extend those galleries or perhaps build new ones, but still I don't think that a gallery, at least directly under the river at any point, will draw from the river over it much. The idea is to get the waters that are flowing underneath this river; not only the visible channel, but the adjacent land which is water-bearing.

I think that these filtration galleries could be constructed in sufficient number and at proper points on this land to drain the surface flow of the river entirely. It would depend upon the depth

at which you placed them, general character of the gallery. From my examination of the ground up there, I can tell where the river has been as well as where it is. The borings we made show that the river has changed its channel. I think there is only one place where it may not have flowed within comparative recent years, and that is a higher mesa that I think it has been ages since it was over that. The river is liable to flow
471 over any and all of it excepting that small portion which is near the southerly end, near station 22 of the Rancho Los Felis. The present main supply ditch makes a detour along this high mesa. The main object in taking that high ground is that it is desirable to tunnel through it, and it is also water-bearing. That does not present an obstruction to the flow of the water from the west down on east. The character of the soil of this higher ground is of the same as the balance, only possibly a little coarser, that is, a portion of it; but it has eroded from the hills to the south. The water seeps under it and goes through it. When you get down to the level of the adjoining land with a well, the character of the soil is very similar to the balance and very much like the soil directly under the surface river as it runs now. It is in the main coarse sand and gravel and boulders in certain proportions. It is not mixed with loam excepting that on the surface there is what we call humus. I think that in actual construction of these headworks, it may be necessary or expedient to put filtration galleries at almost any point on this land, and that until we get the work actually under way an engineer cannot tell how many may or may not be necessary. I think all the land sought to be condemned in this case is necessary to protect the purity of the water to be drawn into these galleries.

Cross-examination:

I think there were plans and specifications for this proposed work prepared and submitted to the city authorities. I know what the city proposes to do there from working upon and planning it. I made tests through a great portion of the territory there with reference to the water in that land. From those tests I ascer-
472 tained that the percentage of water with reference to the whole mass of the material was about thirty per cent.

Redirect examination:

The general plan of this tunnel and these galleries submitted to the council was completed but not the details. I should say that something about 18 or 20 acres of the high mesa of which I spoke had not been overflowed for a great many years, and this is composed of decomposed granitic sand getting coarser as you go down, some washed down from the adjoining hills and some may have been brought there by the river. On the other little mesa which has not been overflowed for a great many years, there is possibly five acres. The elevation of this land is 60 feet higher than the present headworks of the city water company, so that consider-

ably more territory could be furnished with domestic water than is now furnished. A portion of the city would have to be furnished with water by pumping from this supply, but 60 feet difference in elevation in pumping a quantity of water amounts to a great cost. In stating that about one-third of the substance of the land in this area was water, I meant that if you were to make a cross-section of the valley at the eastern end there of this land, that being composed of coarse granitic sand and gravel and boulders, it would be a fair estimate to estimate the water as occupying the voids amounting to thirty per cent. of the mass; of course it would vary, depending upon the size and kind of material, from say thirty per cent. to forty-eight per cent. I include only the water which is beneath the surface. The interstices or the voids of the mass are about thirty per cent. and are filled with water. The cross-section to which I referred is one extending from the impervious wall formed by the hills on the south side of this tract extending in a northerly
473 direction across the easterly end for about half a mile, and this is covered with this same kind of deposit that I speak of in which probably from thirty to thirty-three per cent. of it is water. The map now shown to me is a fairly accurate map of the land and situation, and was prepared by myself particularly for general use at the trial.

BURR BASSELL, recalled as a witness for the plaintiff, testified as follows: I would say the sources of the Los Angeles river is the water flowing upon what is known as its watersheds, and the snows, also. And the watershed embraces what is known as the San Fernando valley and the drainage basins of the Big Tejunga and Little Tejunga and the Pacoima, and all the small streams entering this valley. The area of the watershed is about 450 square miles.

A map showing the drainage area of the San Fernando valley was introduced in evidence, and is hereby referred to and made a part of this statement, and the witness continuing, said: At the lower right-hand corner of this map is the square representing Los Angeles city limits. The red line outlines the watersheds. The portion that is mainly white and has the blue-colored lines running through it is the San Fernando valley or plain. The blue lines and dotted lines represent the water-courses and washes. The darker patches around the border of the map adjoining the red lines represent the mountains and hill portion. On this map there are two areas that are not included in the watershed above the lands sought to be condemned. Forty square miles and 33 square miles, the drainage from which does not flow into the Los Angeles river above the lands sought to be condemned. The elevation of the watershed runs from 500 feet at the point where this land is, to an elevation of over 6,000 feet at some points. The tendency of the water from the shed is to seek the lowest level, and that it is the land sought to
474 be condemned. The flow from this watershed creating the Little and Big Tejunga creeks is first in a westerly direction, and meeting the plain and Verdugo hills to the south, de-

flects it to the west, and then meeting the flow from the westerly end of the San Fernando valley, it is deflected to the southeast, until it arrives at the land sought to be condemned. The narrowest point in that valley is just below this land sought to be condemned. The length of the land is approximately two miles and the confluence of these waters is mainly embraced in that strip of land.

FRED EATON, called as a witness on behalf of the plaintiff, and being duly sworn, testified as follows: Am a civil engineer by profesison; have known the Los Angeles river since 1871 or 1872 from a professional standpoint. Was then in the employ of the Los Angeles City Water Company. Remained with them eleven or twelve years. My duties kept me frequently upon the river. Have been city engineer for four years. Am familiar with the plan proposed for the headworks, and the city water company, and with the land in controversy. Have been over it a good many times. The elevatian is about 230 feet above Sixth and Main streets, in Los Angeles city. The elevation of the land in controversy is about 490 feet above sea level. The amount of water used by the people of the city for domestic purposes, and diverted by the city water company, at the time of my first knowledge of their works in 1871, was about seven hundred thousand gallons a day. That would be between 50 and 55 inches under a four-inch pressure. The amount diverted and used by the city water company today is about 10,000,000 gallons a day, equivalent to about 800 inches. The intention of the city is to run a main conduit, as indicated on all the maps, supposed to be a brick conduit, built from the head of the present main supply ditch, up the river to the westerly end of
475 the land proposed to be condemned. That will have lateral branches running in a southerly and northerly direction across this land sought to be condemned, which is supposed to be pipes with open joints, to collect the water. These conduits will all be laid below the present surface from 3 to 10 feet, and are supposed to collect the waters that are passing underground in the open formation, and to draw the water from the surface. The idea is to take the water out in this manner to get rid of the debris that comes down the river at various times of the year, during the winter season, and prevent the moss that grows in the river from entering the main conduits. To get pure water. It is to strain it; in other words, filter it. I wouldn't say that you can designate exactly at this time the number of filtration galleries or cross-tunnels that may be necessary for the accomplishment of the purpose, because you don't know just how much water you can drain with them. Some will drain more water than others.

The shifting in the surface flow of the river will make a change. The further you get the surface water from one of these subdrains, the less, of course, will be the drainage to that drain. It may be desirable at any time to construct new filtration galleries, or extend those already constructed, as the necessities of the city demand, and also extend those that may be built now.

Q. Now, you may state right here, Mr. Eaton, whether or not, in your opinion, the whole of this land will be necessary for that purpose.

Counsel for the defendant objected to the question, upon the ground that it was incompetent.

The COURT: I think I will overrule that objection. An engineer can give his opinion as to that subject.

To which ruling of the court the defendants excepted.

476 The witness answered: Yes sir, all that land will be needed to take in the entire flow of the river at that point; possibly some more.

Cross-examination:

The length of this trip is about two miles from east to west, and I should say was about an average width of a quarter of a mile. The length of the proposed tunnel extends pretty near the whole length of the land; something like a mile and a half. The city water company have constructed works of a similar nature to those projected, and are taking about seven hundred inches of water, measured under a four-inch pressure, by meane of their tunnels or excavations, or underground pipes. They also divert a good deal of water from the surface. In the vicinity of the point that they draw they take out through these filtration galleries or the water from under the ground. Besides what they take out through these filtration galleries or tunnels that they have constructed, they take out considerable more, possibly as much more as they can, by their tunnels. But that is not all used by the city. It is used to run water power, and whatever they are short of filtered water they use from this surface water, but after the use of it for power it returns into the city zanjas and is used by the city through their ditches. The upper one is the Zanja Madre where the city water company use it for power, the waste water runs into the Zanja Madre, and another zanja, which, I think, used to be 6 E. It crosses Macy street at the old Aliso road. The city diverts by means of the Zanja Madre between 30 and 35 cubic feet. That is between 15 and 18 hundred inches, measured under a four-inch pressure. That is taken at the Buena Vista Street bridge, and that they take out about four or five hundred inches below at the covered bridge. I mean under
477 a four-inch pressure. That is used on some low lands under Boyle heights and in the eastern part of the city; eastern and southeastern corner.

Q. And off into the country beyond the city?

A. I will have to think whether I am positive whether any of that water goes outside of the city or not. I know it goes below the patent boundary, but I can't speak from my personal knowledge that it goes below the charter boundary. I am talking of the water that is diverted at the covered bridge on the east side. Some of the Laguna ranch is inside of the charter boundaries. It runs to the patent. The charter boundary is about 1,200 feet south of the pat-

ent boundary and extends clear across the city parallel with the southern patent boundary. The northern patent boundary lies down along the whole San Rafael rancho. It makes a point down by the confluence of the Arroyo Seco and the Los Angeles river. The charter boundary runs right across, east and west. There is no difference on the north, except that triangle. I am speaking now of what it was seven or eight years ago, and not of the recent addition to the city, taking in Highland park. The patent boundary coming in from the east to the west, turns southward, and then southwesterly and then northwesterly making a triangle. The charter boundary runs straight across. There is no difference between the charter and patent boundary on the west of the city. Aside from the Zanja Madre and the city water company's works, the city diverts about 500 inches in what is called the "main supply ditch," carrying it through the canal and reservoir ditch and the east side ditch. It varies from five to seven hundred inches, I should judge, throughout the year.

Q. Are there any others below the Zanja Madre and the one on the east side, or are all these lower ditches supplied from the Zanja Madre?

478 A. Well, I speak of the Zanja Madre and this other ditch—I have forgotten the name of it. It taps the river at the same places as the Zanja Madre. There are two main supply ditches; one runs off by Alameda street, parallels Alameda, between Alameda and Los Angeles, clear on down to Aliso street and First street. It terminates at First and San Pedro. This is the Zanja Madre, and then it branches there and runs down First street. There used to be another branch continuing straight down. The other ditch crosses Macy street at the old Aliso road, and used to run a cracker factory on the old Aliso road. There is a ditch taps the stream on the east side just beyond the Macy Street bridge, and takes water over on the east side of the river. I can't tell what amount of water is used altogether inside of the city limits. There may be some of this water used outside. I remember that there was water used outside the city from this ditch, but I don't know anything about it now. The total amount diverted for use, without regard to where it is used, I should say, is about 75 cubic feet per second; about 3,750 inches altogether. I am not counting in that computation the amount of water that the city water company takes for power purposes, and when used flows into the city ditches twice. That is about the total diversion. All the diversions from the river amount to about 75 cubic feet on an average. It will vary from that from year to year. That was used for irrigation, except what the water company diverts for domestic purposes, and also for flushing sewers. There is a good deal of water diverted by these irrigation ditches, used for flushing sewers, including the outfall sewer to the sea. The water diverted by the city water company and supplied by the city, is used also for sprinkling streets and extinguishing fires, and all sorts of municipal uses, besides the domestic wants of the inhabitants. (The city was agreed to contain about 75,000 inhabitants.)

479 The valley at the place where the tract of land lies, which is sought to be condemned, is a part of the San Fernando valley, and is a part of the Providencia rancho, and partly in the San Rafael, and also in another called the Cahuenga. The valley at the point where this land lies, at the shortest distance across, I should say, is about two miles and a half or three miles. I never measured it. I am estimating from the base of one hill to the base of another. The tract sought to be condemned is at that same point about a quarter of a mile in width. The elevation of the land sought to be condemned is about 450 feet above the sea level at its eastern extremity. And that is about 200 feet above Sixth and Main streets. That is about the surface of the water of the river. At the western extremity of the tract the surface of the water of the river is at an elevation of about 500 feet above the sea level. I had nothing to do with projecting the plans for this system of headworks. I was city engineer in 1887 and 1888, and again, I think, became engineer in 1889 or 1890, and served two years. The capacity of the outfall sewer from Los Angeles to the sea is in the neighborhood of 30 cubic feet per second; about 1,500 inches.

Redirect examination:

It is a fact that the city now makes a large use of the water for parks, which water comes from the main supply ditch and is not taken through the city water company's conduits. Taken by the city direct from the river. The first use of water for the parks was the first year I was city engineer. We laid for the Sixth Street park, which is now called Central park. That was there in 1886, and was the first park. We built a pipe down from the Toberman reservoir, which is supplied from the woolen mills ditch, and is a branch of the main supply ditch. The next park is East Los Angeles, which is supplied from the East Side branch of the
480 main supply ditch. That park has a fresh-water lake in it. Then the next park was the Westlake park, which is supplied from the woolen-mill ditch. All the improvements on these parks have been made since 1886. The city is the owner of another large park over in Boyle Heights, the Hollenbeck park. That is supplied from the East Side ditch. There is another park known as Elysian park, but I believe there is no water taken from the river for that. I think what water they use they get from the city water company. That park contains about 500 acres, and is practically unimproved as yet. It is being gradually improved, however.

The land sought to be condemned is, in my opinion, the best point to make a diversion for the purpose for which it is intended, because you can get the greatest quantity there by the gravity system at the greatest elevation.

Recross-examination:

When I speak of the main supply ditch I mean the ditch that is taken out at or about this tract of land sought to be condemned, and after it comes down some distance it is divided into two. One goes

off and supplies the East Side reservoir, and the other the woolen-mill ditch. Elysian park has an elevation of seven or eight hundred feet, at its highest point. I don't think any of it could be covered by gravity from this tract of land. The water that is used there is pumped from the station of the city water company.

In answer to questions by the court, the witness testified: I have examined the plans proposed by the city, upon which these water works are based, and I don't think that there are other plans which the city might use for the same purpose equally as good, from an engineering standpoint. I think that is the most practicable thing for them to do. There are other ways.

481 Q. The methods which they now use for diverting water to obtain a water supply for domestic purposes; how is that, as to being sufficient, if there is a considerable increase in population?

A. Well, there might be—there is visible about 30 million gallons a day there on that land. A flow of 30,000,000 gallons now. That varies somewhat, sometimes a little more and there are years when there is less. From the place they have now they could obtain three times the supply they now have, but it is not sufficient elevation. They could not obtain it without increasing their pipes and conduits. They would have to run four or five times as much pipe as they have now, and have to increase their drainage area, too. The equivalent of 30 million gallons per day, in inches, is about 2,500 inches. I said that there were 30,000,000 gallons, in round numbers; it is a little over that; it is 32 or 33 millions—that is, on the land in controversy.

It was stipulated that the boundaries of the city have been extended recently, and that proceedings were pending for the still further extension, and there has been an election called for the purpose.

FRED EATON was recalled for the plaintiff, and testified: Am acquainted with the territory south and west of the city known as Vernon, and University, Pico Heights and Harper tract. I would say there is included in those districts about nine or ten thousand inhabitants; within the limits of the proposed annexation. The average increase of water in the city for domestic purposes since 1884 is about 800,000 gallons a year. That would be 8,800,000 gallons, or about 650 inches in eleven years. An average of between 50 and 60 inches per annum. The total increase has been about 650 inches. During the last two years the increase in consumption has been at least a million gallons a year, or about 75 inches.

482 Cross-examination:

Am including in my estimate for domestic uses just what the city water company is supplying. They supply water for household purposes, some flush tanks, partially for flushing the sewers, but not altogether, and for sprinkling streets, and extinguishing fires, and all the municipal uses that they supply. They don't supply the parks, unless one park up here, the Plaza. They supply that, and

with possibly, I guess, Prospect park. I am not certain about that. They supply water for sprinkling lawns. I don't know where Agricultural park is supplied from; that is outside of the city limits; part of it is. There is a small corner which is just inside the charter limits. The northeast corner. It is all outside the patent limits. The greatest increase in the population and the building of houses for residence purposes has been in the southwestern portion of the city.

Mr. Scott, counsel for the plaintiff, here stated that they had concluded, in accordance with the suggestion of the court, or intimation, that it would be best to defer all the testimony in regard to the amount of water and the sources from which it comes and the questions with reference to whether or not the subterranean waters are a part of the Los Angeles river, until they got before the jury. That it was almost impossible to distinguish and separate the different points, and although it might be proper on the question of necessity to show that the city owned the waters underneath the land which it proposed to take, and for that reason it was essential that it should acquire the land, in order to get their own waters, yet that the things were so interwoven that it would be better to leave it until they got to the jury.

The plaintiff offered in evidence from the transcript in the Baldwin suit, the documents appearing in the foregoing bill of exceptions:

483 Plaintiff also introduced in evidence the map marked Plaintiff's Exhibit A–1, and which is here referred to and made a part of the statement.

Plaintiff here rested in the trial of the issues before the court, and the defendants then introduced a number of conveyances, under which the said defendants claim title to the lands in controversy, and to the tract known as the Pomeroy and Hooker tract.

The following is a list of the instruments so introduced:

Defendants offered in evidence the following instruments and transfers affecting and conveying to and vesting in defendants the lands sought to be condemned.

Left-hand "P" and number refer to the pages of the defendants' abstract used at the trial, by stipulation, as being correct copies of the original documents of record.

Will of Jose Maria Berdugo, dated August 13, 1828, in which he devises the property known as the Rancho San Rafael to his children, Julio and Catalina Berdugo, Book A of Deeds, page 1045.

Contest. Juan Feliz in behalf of his wife, Maria Ignacio Verdugo, one of the daughters of Jose Maria Berdugo, deceased, contests will of said deceased, before first alcalde, who refers it to arbitrators selected by contestants and Julio Verdugo as executor, and by the arbitrators decided in favor of sustaining the will.

484 Francisco Lopez and Pedro Lopez to and with Miguel Triumfo makes an exchange, in which Triumfo exchanges the rancho known as "Cahuenga," with the Lopez for the rancho known as the Tejunga. Rec. Book "B" of Deeds, page 43, on Mar. 13, 1845.

Deed. Pedro Lopez to Francisco Lopez, part of "Cahuenga" recorded in Book A, page 723, deeds.

Deed. Dated Oct. 30, 1849. Vicente de la Osa (who was the grantee in a grant from Mexico) to Alexander, Mellus & Co., of the Rancho La Providencia. Book "A" Deeds p. 770.

Deed. Francisco Lopez to Augusta Olvera, Book 1, page 60 of deeds, Oct. 7th, 1851, of the Rancho Cahuenga.

Deed. Pedro Lopez (by sheriff) to Alexander & Mellus, of the Rancho Cahuenga, Book 1, p. 244 deeds. Nov. 15th, 1852.

Deed. Dated Oct. 6th, 1853. D. W. Alexander to Francis Mellus; La Providencia rancho. Book 1, page 385 deeds.

Deed. Dated Oct. 6, 1853. D. W. Alexander to F. Mellus of Rancho Cahuenga. Book 1, page 388 of deeds. Oct. 7, 1853.

Deed. Francisco Lopez to Francis Mellus. Book 2, p. 298 deeds, dated June 7, 1855, of Rancho Cahuenga.

Deed. Augustin Olvera to F. Mellus of Cahuenga, Book 3 of Deeds, page 199; Sept. 21st, 1855.

485 Deed. Dated Dec. 18th, 1855. Julio Verdugo *et al.*, to Jose L. Brent, certain tract being part of Rancho San Rafael and known as Santa Eulalie. Book 3, page 325 of deeds.

Deed. Dated Dec., 1857. Julio and Catalina Verdugo to Jonathan R. Scott, property known as San Rafael. Book 4 Deeds, p. 20.

Deed. Julio Verdugo and Catalina Verdugo to Jose L. Brent, dated January 3rd, 1858, of that portion of San Rafael rancho known as Eulalie, also a strip 8 varas wide on the north boundary of Santa Eulalie and running north over the lands of first parties to a point in the Los Angeles river where first party can select, mark out or use as a proper point to take out water from Los Angeles river. Book 4 Deeds, page 19.

Deed. Dated Jan. 11th, 1858. J. L. Brent to J. R. Scott, that portion of San Rafael ranch known as Santa Eulalie and right of way to take out water, &c. Book 4 Deeds, page 24.

Agreement as to boundary. F. Mellus with J. R. Scott. Book 2, page 429 of deeds. Date of record Jan. 20th, 1858.

Deed. F. Mellus to J. R. Scott. Carrying out above agreement. Book 4, page 29, Jan. 20th, 1858, of deeds.

Deed. J. A. Scott to F. Mellus, same as above. Book 4, page 31; Jan.

486 Proceedings. F. Mellus *vs.* His Creditors. A. F. Hinchman appointed assignee.

Deed. Dated Nov. 27th, 1860. F. Mellus an insolvent debtor to Augustus F. Hinchman, assignee. All his effects and real property, Book 1, page 33, of mis. records.

Deed. Dated February 4th, 1861, A. F. Hinchman, assignee, to Alexander Bell, Rancho Providencia. Book 5, page 248 of deeds.

Alexander Bell brought a suit to foreclose a mortgage on the Ranchos Providencia and Cahuenga, against Alexander & Mellus *et als.*, which went to a judgment in favor of Bell. Property was sold by sheriff to Bell to satisfy said mortgage.

Deed. Dated Feb. 10, 1862. Alexander, Mellus *et al.*, by T. A.

Sanchez, sheriff, to Alexander Bell, of Cahuenga and Providencia. Book 5, page 516 of deeds.

Deed. Dated July 29th, 1863. J. R. Scott to William Workman. All interest in San Rafael. Book 6, p. 241 of deeds.

Deed. Dated Sept. 17th, 1866. W. Workman to Alexander Bell of San Rafael ranch. Book 8, page 174, of deeds.

Deed. Dated March 20th, 1867. Alexander Bell to D. Burbank. Ranchos Providencia, San Rafael and Cahuenga. Book 8, page 430, deeds.

Patent. Dated August 6th, 1872. U. S. to D. W. Alexander and Francis Mellus of Rancho Providencia. Book 1, page 238 of patents.

487 Patent. Dated Jan. 28th, 1882. U. S. to Julio & Catalina Berdugo of Rancho San Rafael. Book 3, page 207 of patents.

Patent. U. S. to Alexander & Mellus and A. Olvera of the Rancho Cahuenga. Dec. 16th, 1886. Book 4, page 16 of patents.

Deed. Dated Dec. 27th, 1886, D. Burbank to W. H. Goucher of Ranchos San Rafael, Providencia and Cahuenga. Book 187, page 239 of deeds.

Deed. Dated Dec. 28th, 1886. W. H. Goucher to Providencia Land, Water & Development Co., of Ranchos San Rafael, Providencia and Cahuenga.

Deed. Dated Feb. 29th, 1892. Prov. L. W. & D. Co. to C. G. Harrison. Book 778, page 91 of deeds, of block 65.

Deed. Dated Feb. 29, 1892, C. G. Harrison to A. E. Pemeroy. Book 781 of deeds, p. 84 of block 65.

Deed. Dated March 1st, 1892. Prov. L. W. & D. Co. to J. D. Hooker. Book 785, page 53 of deeds; Book 785, page 237 of deeds; park tract.

Articles of incorporation of the Providencia Land, Water and Development Company, dated Dec. 22nd, 1886. Filed on December 30, 1886.

In the deeds of conveyance and instruments in the said list contained, there were no reservations or limitations upon the title conveyed, except as herein otherwise expressly stated. The

488 deeds were in ordinary form, purporting to convey the fee-simple of the property.

A copy of so much of the patent of the United States, of date August 6th, 1872, issued to D. W. Alexander and Francis Mellus of the Rancho Providencia, as is material to this case, is set out in foregoing bill of exceptions.

A copy of so much of the patent from the United States to Alexander and Mellus of the Rancho Cahuenga, of date December 16th, 1886, as is material to this case, is set out in foregoing bill of exceptions.

A copy of so much of the patent of the United States to Julio and Catalina Verdugo of the Rancho San Rafael, of date January 28th, 1882, as is material to this is set out in foregoing bill of exceptions.

The said defendants claim the property in controversy and the whole of the Pomeroy and Hooker tract, under the said patents from the United States Government of the said three ranches.

A. E. POMEROY, called on behalf of the defendants, and being duly sworn, testified as follows: Am familiar with the description of the property in the deeds, one to Hooker and the other to myself, which have been introduced in evidence. Am acquainted with the lands. Know where the Los Angeles river flows, with respect to this land, and it flows through them in a southeasterly course. The river flows through that portion that lies within the Cahuenga, and through that portion which lies within the Providencia, and through the portion which lies within the San Rafael. Mr. Hooker and myself hold both of those tracts jointly; one of them is a conveyance made to myself, and the other a conveyance to Mr. Hooker of another tract. We each own an undivided half in each of the tracts. The title of that which rests in me, I hold for myself and him, in equal shares, and the same with respect to the portion the title to which is vested in him. He holds one half of it for me.

489 The patent by the United States of the Los Feliz rancho was introduced in evidence by the defendants, and a copy of so much as is material to this case is contained in the foregoing bill of exceptions.

G. O. NEWMAN called on behalf of the defendants, and sworn, testified as follows: Am a civil engineer. Been in that business since 1863. Graduate of Polytechnic Institute of Orebro, in Sweden. Been engaged in the profession ever since; mostly in Riverside county. Came to Riverside in 1875. Afterwards went down and built the Orange reservoir in 1877. Was afterwards in the United States Geological Survey with Clarence King.

Have been over the land sought to be condemned. Tests and experiments have been made in that land under my observation, concerning the waters that lie beneath the surface of the land there. Two trenches cut in the land, one near the lower end of the tract, and one near the upper end. The lower will average about eight feet, and the upper trench about ten feet in depth. The water that comes into those trenches is clear and nice tasting water. In my opinion, the taking of the 312 acres, proposed to be condemned here, is not necessary to preserve the purity of water developed by means of tunnels and filtration galleries run into that land. It is not necessary to take so much ground to be able to run these different tunnels into the land. You don't necessarily need to own the ground to be able to run in that tunnel. The tract varies in places from a quarter of a mile to a half of a mile wide, and I cannot see any necessity for a quarter of a mile of ground to run in a water tunnel. If you wanted to run a tunnel 16,000 feet long, you would want a strip of 16,000 feet in length, but it wouldn't be necessary for it to be 16,000 feet in width. I don't consider that stock running over the land, or the use of the land for the ordinary purposes of husbandry, would affect the water a particle, because there is sheep pastured on the ground now, and there is no evidence that it has any ef-
490 fect on the water at present. The sheep pasture over the land where those excavations were made, and where the wells

were bored, and there is no discernible effect upon the waters by reason thereof, or anything that was being done. The flow of the Los Angeles river runs through that land in a general course about east and west, and it is between three and four feet deep from the top of the banks immediately adjoining. On this tract of land we can distinguish three different levels. One river bed, and another what I might term overflow land; another is high mesa. There is still a fourth grade; that is mountain. Leaving out of sight the mountains, the general level of the mesa is, I should judge, between ten and fifteen feet above the surface flow of the river. If the tunnel proposed to be constructed, were constructed and water developed therein to any extent, in my opinion, that supply of water in the tunnel would not be affected by a change of the bed of the Los Angeles river; not materially, because the tunnel mainly goes under the high mesa land, where the river never has been and isn't likely to go over; and if this proposed tunnel and its attendant filtration galleries were constructed by the city and developed water to any amount, one thousand or two thousand, or any other number of thousand, inches of water, and there should be a change of the river bed within the limits it is possible for it to change, it would not, in my opinion, have any material effect upon the quantity of water that would flow from these tunnels and filtration galleries. The banks of the river vary in height above the surface, some, but the lowest is about three feet. Maybe, at the lower end it may get down to two feet, but that is only for a short portion. I am speaking of the immediate banks of the stream. There are some places where the banks must be six feet in height above the river. That is where it comes close to the high mesa, that I have spoken of.

491 There the river runs pretty near the mountain. I know where the ditch called the main supply ditch taps the Los Angeles river. That is at the upper end of what I call the mesa land; and the mountain is very near to the flow of the river about where that ditch commences. The ditch just sweeps the base of the mountain, and the mountain rises, I should judge, between 75 and a hundred feet above it. The hill there is on the south side of the river. On the north side at that place is bottom land.

In my opinion, it is practicable to determine the amount of water, approximately, that can be developed there or would be developed by any probable system of works, and if I were informed of the amount of water desired, and within the limits of possibility of development, or probable development, I could determine what works would be necessary for the purpose of developing that quantity, and after the works were determined and constructed in a proper manner, in my opinion, the ownership of all the rest of the 312-acre tract of land would not be necessary for the purpose of protecting those works. The San Fernando valley along this tract of land, at the lower end, is narrow, but after that it keeps widening very fast. At the lower end it is somewhere about a mile and a half or two miles in width. The tract of land sought to be condemned is pretty uneven in width, and I should judge would cover about a quarter of what you might term the valley, the comparatively flat

ground. The agricultural land. On the southern side of the river this hill that rises to a height of 75 feet above the river, is within the tract sought to be condemned. That piece of land really covers the whole of the river bottom, from high bank to high bank. So it would be rather hard, if not entirely impracticable, to develop water above the tract sought to be condemned on the river, and get out of it without crossing this tract of land. There is no necessity for the condemnation of the whole of
492 the lands sought to be condemned, except in case that they want to shut out anybody else from developing water higher up there; that they want to have full control from bluff to bluff. It is not necessary at all to take the whole of the tract for the purpose of constructing the tunnel and maintaining it after it is constructed. A strip of land *land* 33 feet in width ought to be ample for the construction of the tunnel. If the submerged dam was put in at the point marked on the map, it might have a tendency to force the water up through the bottom of such a tunnel to some little extent, but if they put in a submerged dam they surely wouldn't need any tunnel, because the submerged dam would raise the water to the surface at the dam.

Q. Would that depend on the extent to which the dam is submerged?

A. Well, a submerged dam means that it should go down to bed rock. Some call it a submerged dam to drive down some piling, or something to obstruct the water a little. It would be a submerged dam if it was under the ground. Still, when I speak of a submerged dam, I generally mean it should be a tight submerged dam. It should go down to hard material, and it won't stand very long if you don't.

Cross-examination:

I went up on the land to examine it and see what facilities there were to develop water. Examined the water in the trenches and wells that were cut and bored there. Tasted of it frequently, but didn't analyze it. That water comes from the watershed of the San Fernando valley. The San Fernando valley and the whole drainage area of the watershed shuts in right against that bluff where this land is. The strongest underground flow is at that point. I don't know that it strikes clearer against the point about where the water
493 is diverted into the present main supply ditch, than at any other point. It strikes all along that strip of land. It is unquestioned but the watershed from the San Fernando valley drains towards that bluff, and there turns and follows the bluffs lengthwise with the river. The Tejunga also. The Tejunga certainly has no underground channel. The water from the Tejunga creek sinks out in that valley and percolates through the whole of the valley, and that whole percolation strikes down against that bluff where the land in controversy lies. Not at any particular point, but all along. Our development shows that it is just about as strong at the lower end as it is at the upper. The cross-section of the valley just

at that point would show about one-third water, and that water moves. There is no question of that, because the wells show that it has a grade line. It could not help but move on the inclination of the saturated plane. I don't know where the river flowed in 1889 up there, nor in 1884. I never was there at that point the last fall. Wherever it flowed each year I would call the river bed. The high mesa that I spoke of, is composed of soil on top and after that it is sand and after that gravel. I could not tell when the river ran there, but it is surely a good many years ago. It is possible that the river flowed at some time where the mesa now is, but the mesa has been there some time. It is not probable that the river did flow there. The sand and gravel came from the hills to the south of it. The rains have carried it down from the hill, and gradually made that deposit. It may be possible that the river flowed there before that deposit was made, and if it did, then at that time that was the bed of the river. When I speak of the river bed, I mean the ground immediately under the surface flow of the river. The surface flow does not indicate anything concerning the underground flow. There may be cases where a river can exist
494 in a place where you can reasonably say that there is a flow under that river bed, but in this case where you see how the streams have changed. Now, there is the Tejunga has changed for miles, just because something happened to shut it up at the mouth of the cañon, it takes a new channel and shoots miles away across the country. Is that any reasonable thing to show an underground channel should change the flow wherever that surface stream goes? I don't think it is. I know the Tejunga made that sort of change, because I see it on the county map. It shows the different channels of the Tejunga; how it has run, and I have been on the ground and seen them on the ground there. That is in November last. If the city had no place upon which to put the dirt from the various tunnels and filtration galleries, owned no land in the vicinity there might not be land enough on the 33-foot right of way to deposit all the dirt. That would have to be carried somewhere, but it wouldn't take any 312 acres. That depends something on how big a tunnel you cut, and on various questions of that kind. I didn't see that the stream on this land flowed in three or four different streams, some distance apart, nor that it was made up at some points of two or three different little flowing streams as much in some instances as a hundred yards apart. So far as I saw it, it was one stream all of it, with well-defined banks about three feet high. Not exactly perpendicular, but as steep as the material could stand. There were places where you could drive across it. I didn't state that this land covered in width the whole of the valley. I stated it covered from high bluff to high bluff. The land north of this rises pretty fast. It is a mesa, but still it is rising towards the mountains. I can't see any other object in condemning the whole tract, except to prevent somebody from getting around there to take the land clear up to the top of the hill, because it is surely
495 not that it is to protect the headworks, or to develop water. There may be some other object, but I can't see it. The city

might own a little more than 33 feet in width in some places to dump material, but as for the right along that filtration gallery or tunnel, I cannot see that you possibly need any more ground than just to move along. I don't think of any other object for owning the whole land. You might want to sink some shafts into that to hoist out some of the material, and in such case you might want a little more ground for a dumping place. I should judge there was about six or seven thousand people here in Los Angeles city in 1875. If the needs of the people of Los Angeles for water should increase from 50 or 60 to a hundred inches a year, or more, it might become necessary to build additional filtration galleries, and probably would. You might want to use more of this land, but you wouldn't need to have anything else than a right of way. My idea is that you can get that when you come to it. If you wanted to extend your works again, you would have to have it. I don't think that it is probable that an examination or driving shafts or galleries there would develop that one point upon the land was more desirable than another for the purpose. It might be that more water could be procured in the galleries than in another, to some little extent, but not very materially, because for the whole length of the land the whole percolation sets in against that hill. I didn't mean that there was more water in one spot than another. I meant that there might be clay strata or something that might stop the water and make it go out in one place more than in another. It would not be desirable to avoid those places where there were clay pockets with filtration galleries and that kind of work. If you started in to run a filtration gallery it won't pay to keep dodging every little clay pocket you come to.

You have got to go tolerably straight. To my mind I
496 have already prospected enough so that I feel certain I know where to run those galleries. I don't know that for a city growing very rapidly it would be desirable to have a both submerged dam and the tunnel and filtration galleries. If I should go there and put in a submerged dam, I surely wouldn't go to the expense of putting in those galleries with the submerged dam. If I put it in higher I would get all the water. All the water comes through that opening where you propose to put the submerged dam. I didn't mean to say that the underground water runs in any channel. I didn't say so. I say that water necessarily has got to percolate through the soil between those two mountains to get out through that gap where the Los Angeles river goes through into the lower end of that land.

The next proceeding had before the court in this case, was on the afternoon of March 4th, 1896, the time of the examination of Mr. Newman, above reported, being in the forenoon of the said 4th day of March, 1896; and in the afternoon at two p. m., the jury was impanelled and sworn in the case, and *and* excused until the following morning, and the trial then proceeded before the court upon the issues to be submitted to the court.

L. FRIEL was called as a witness on behalf of the defendants, and after testifying as to his qualifications as a civil engineer, and his acquaintance with hydraulics, testified: I have made maps of that section of the country, showing the location of the land sought to be condemned, with reference to the River Los Angeles, and the various elevations along the course of the strip that is proposed to be taken I have been investigating the matter under the employment of Messrs. Pomeroy and Hooker. I made the map entitled "Plat showing the property of Pomeroy and Hooker, situated in the Providencia, San Rafael and Cahuenga, Los Angeles county, Cal." It was done in my office, under my direc-
497 tion. The lands sought to be condemned is included in the line colored red on the north and east and brown on the south. The exterior boundary represents the Pomeroy and Hooker 1,400-acre tract, which includes the tract sought to be condemned, the 312-acre tract. The parallel blue lines represents the course of the Los Angeles river. The square piece on the north, marked "Cahuenga," is a tract of land that is inside of the Providencia rancho and known as the Cahuenga tract, which was patented separately from the Providencia rancho. The San Rafael rancho commences at the station of the Rancho Los Feliz marked on the map; the intersection of the grant line including the red line of the tract sought to be condemned. The single blue line on the map represents the ditch known as "The main supply ditch." The Rancho Los Feliz is directly east of the Pomeroy and Hooker 1,400-acre tract. The triangular piece upon the eastern portion is the part of the Rancho San Rafael which lies within the tract sought to be condemned. The remainder of the tract is in the Providencia rancho. The black marks, called hachures, represent the hills. The arrowhead represents the north. The lands on the south boundary are about 350 feet in elevation above the surface flow of the river. And the elevations run down to 150 feet near the western extremity. The river along there runs at the base of the hills within a hundred feet. About 25 acres of block 65 of the Scott tract lies within the land sought to be condemned. The red line marked Los Angeles City lateral No. 4, represents a lateral from an east and west line, and is termed the main tunnel line. Lateral No. 4 is about 900 feet in length. The main tunnel is about 8,700 feet. On the eastern extremity and within the triangle, that is a part of the San Rafael. There is two parallel dotted lines representing the proposed
498 submerged dam. The elevation of the mesa on the north, opposite the submerged dam, is about 20 or 25 feet above the surface flow of the river. The elevation on the south side, at the base of the hills, is about 450 feet above sea level, and six or eight feet above the surface of the river. The eastern line of the land proposed to be condemned, at the southeastern corner, is about 30 feet above the valley land. That is at station 21 of the Rancho Los Feliz, and is the common corner of the San Rafael, Los Feliz and the Providencia. There have been some cuts run on the land under my supervision. One is near the eastern boundary of the 300-acre tract, and the other in block 65 of the Providencia tract.

The one at the east is upon the south side, and the development at the west on the north side of the river. The length of the cut on the north side is 600 feet, at an average depth of about 9 feet. We found water at about 2 or 3 feet below the surface. The quality of the water developed is nice and clear and good to drink. No impurity discernible to the eye or taste in either of them. The wells were put down upon each side of the development. We found water in the wells from a depth of one foot to five or six feet. I know something of the plan proposed by the city in the construction of the headworks. If the main tunnel and filtrating galleries were constructed and water developed to whatever extent it might be, it would not, in my opinion, be necessary to have the entire 312-acre tract for the purpose of preserving the water there developed against impurities occasioned by the ordinary use of the land for farming or stock-raising purposes.

In answer to question by the court, the witness stated it might be desirable to own the 300 acres. That out of the 300 acres you would be able to develop more water than is laid out by these galleries. I don't know that I know to what depth it is proposed to run this main tunnel. I know what the original scheme, the plan that was made up
499 two years or more, was. It was at an elevation of 450 feet above the sea level, starting in at the lower end. At the upper end it was about 35 feet deep, I think. Below the surface of the ground. At that depth I don't think there would be any danger of the water being rendered impure by the ordinary uses of the land for agricultural or stock purposes. I think it is practicable to determine what work would be necessary to construct in that land to develop a given quantity of water, provided it was within the limits of its capacity at all. If I knew what quantity of water it was desired to develop, and it was within the limits of capacity of development in that land, it would be practicable to project the works necessary to develop that quantity of water in my opinion.

I cannot say that I know what the function of the proposed submerged dam is. The borings have been made both to the east and west of the place where it is proposed to put the submerged dam. Three wells were put down at the western portion of the tract and three towards the eastern portion. The nearest one is about 1,600 feet from the submerged dam. One of those wells was put down about 130 feet. That was about the northern portion of the wide part of the tract. One was put down near the headgate of the city ditch, and another near station 22 of the Rancho Los Feliz. Upon the western portion one was put down in block 65 and the other about where—near the southeast corner of the Cahuenga tract. The deepest of these wells was about 200 feet. At that depth we found hard rock. In my opinion, the submerged dam would not be necessary to the development of waters by means of the main tunnel and those proposed laterals. The main tunnel starts about 1,200 feet east of station 22 of the Rancho Los Feliz, and about 500 feet south of the river. If the tunnel were constructed and

these filtrating galleries, and there were developed in
500 them any quantity of water, say *say* from one thousand to two thousand inches, and if from some cause the river should change its channel, within the limits of probable change, I don't believe it would have any material effect upon the water flowing in the galleries. In my opinion the waters flowing beneath the surface of the land are not supplied by the water flowing in the natural channel of the river, but both are proceeding from some other source. The water in the land is not from the river. All that remains of the 1,400-acre tract of Pomeroy and Hooker, after deducting the 312 acres which they seek to condemn, lies above the 312 acres. In the event of the development of waters upon the portion of the Pomeroy and Hooker tract not taken, they could not be gotten away and carried off, without going over the land that is sought to be taken. The land above is water-bearing land. The greatest elevation of the surface of the ground along the line of the tunnel is nearly 500 feet above the level of the sea at one place, and passing over the point of the hill. The main tunnel passes under that point of the hills that I speak of, and is about 75 or a hundred feet from the base.

Cross-examination:

The object in digging these cuts was to develop water to show the amount of water that could be developed by making those cuts. To a certain extent when I say it will not be necessary to take the whole of this tract, I mean it is not necessary for the purpose simply of building the tunnel and filtration galleries, which we have upon the map. The whole tract might be desirable for the purpose of developing water. The whole tract would be a very desirable acquisition for the purpose of headworks for a big city. As the needs of the city increase it would become proper and desirable and
501 necessary to drive other filtration galleries for the development of the water and for increasing the flow. After a filtration gallery has been in place for a long time it is apt, in a saturated plane of that kind, to draw less water than when it was originally put in. Where an increase of water is necessary, it is desirable in systems of underground conduits, to drive new conduits for the underground water. When I speak of the flow not being rendered impure by stock, I refer to the flow of the water in the tunnel at the depth I consider the tunnel is to be driven. If the filtration galleries run from that tunnel and approach nearer to the surface, until they come almost to the surface, the water might be polluted by stock. But in running the gallery they would be getting deeper in the ground from the main tunnel, if you were making galleries to develop waters. I do not think it would be a benefit to the water to have the stock run over the land nor to have ordinary stock-raising over the galleries. I would not have a pasture or anything of that kind over the tunnel, no matter how deep it would be. I would not want a hog pasture over it at any depth. If it ran eight or ten feet, or less, it would be probably that the waters would be polluted if

they had a range of any kind over it. It would filter to a certain extent. If a stock yard were located over it, it would certainly pollute the waters. If the purpose of the submerged dam was to divert into this conduit the surface water, as well as the underground water, the dam would become valuable whether it went to bed rock or didn't, for the purpose of diversion, but to divert the water of the river you would not need the submerged dam.

Q. But it would be a very proper use to put such a dam to, wouldn't it?

A. Well, I would not advise the construction of it. It might become in many emergencies quite valuable.

502 My statement that the water in this land is not from the river is based upon an investigation that I have been making for the last two months which showed that in general there is a slope of the surface water and the river acts as a cut or channel through that slope and there is only a little water upon each side of the slope of the water; the water stands higher on each side of the river than the water in the river; that is true everywhere I saw; the water in this land, in my opinion, works its way down from the San Fernando valley and mountains above; it comes from the north and west of this land and to get on this land on the south side of the river it goes under the river; the water in the river is percolating, coming out of the sides of the bank on each side; it comes from the same source that the water does on the south side of the river; and the water on the south side of the river is evidently raised by the under pressure caused by the water that is back; it rises and then it falls back or works its way back into the river; it is percolating down the valley, it comes down and strikes the Cahuenga range of hills and it then must rise and flow east; striking the hills causes it to rise to the surface; it works its way along the hill, it then, in my opinion, works its way down the river-course; I have not yet determined the points at which filtration galleries would be best located for the purpose for which they are intended; the general direction of the movement of the water under the San Fernando plain is a little southeast until a portion of it strikes the hills and then it would move easterly; the flow of the river under this land follows the same general direction as the surface flow; in boring our wells in this land we struck sand, gravel and boulders and some small clay strata, some of them are 2 to 4 feet in thickness, they would not be the same in any two wells nor at the same elevation and they did not seem to be continuous; we ran through clay spots in each of the deep wells; I don't think a regular strata of

503 clay extends over the whole; this clay strata is not water-bearing; the water will not move through it, but around it; in building the filtration gallery it would be desirable to avoid these clay deposits; if filtration galleries of loose joints or perforated pipes should be laid at say something like 5 feet to the surface, the drainage would be from 100 to 125 feet on each side; if the gallery were run under the surface flow of the river it would depend upon the material as to how near the surface it would have to be in order to drain the surface flow, if it was composed of fine silt sand some-

what cemented you would get a very little water at a few feet; I know the conditions of the soil there; I made no borings in the surface of of the river there to determine what the bed was composed of; the waters bring down the finest silt-sand material and the water does not percolate through them as fast as through the material on each side; if you were to create a void under the river at a depth of 5 feet the surface flow would find its way down to that void very quickly; it might not all as I say it is owing to the material between the bed of the river and the gallery; if the river bed were of the same character as the land adjoining it and you were to run a gallery lengthwise under the river most of that water would find the gallery but if the lateral crosses the river at right angles there would be a small portion of it go into the gallery; if the gallery were large enough it is reasonable to suppose that you would get all of the water flowing in the stream; I know from the records and maps that the river has changed its course towards the eastern portion of this land; if the river should change its course there and go further over these filtration galleries under its bed, the effect on the amount of the water in the galleries would be perceived very little at once, except as far as the water of the river being filtered and with regard to these the effect would be perceived at once, but the galleries would
504 still collect water from the general level of the river in that portion of the land; if you were taking the river down through the filtration galleries from this bed and this bed should change and go off from there, the water would rise to the general slope of the sheet water and then the galleries would be collecting from that water; the galleries would then develop water other than surface water in the river; the amount might not be just as much because you are filtering the entire stream of the water in a small place and the other then would be all collected water; if the river were moved away from the pipes you would not still get the surface flow in the pipe but they would develop this other water there which would assume the slope that it now has; if you were filtering water from the river that water would have more pressure than this water in the land which would be percolating and going down the valley and would also be collected in the galleries and increase the amount of water which was being filtered from the river; if the pipes were draining 125 feet on each side the voids created would be supplied by other water which is there to take its place and the voids would be filled from the pressure behind and below; they would not affect the flow of the water up to the top of the watershed because we can actually demonstrate what the drainage area of any cut would be; the effect of draining this water would not be appreciable upon the surface of the sheet water only for a certain distance; it would probably accelerate the percolation somewhat even beyond the line of saturation; I have formed an opinion to a certain extent on the question whether the flow of the water through the San Fernando valley for a mile above this land is general over the whole valley; that opinion is that the water is percolating from the highest to the lowest land, passing on down not only through or by

this land, but through the main gap lying between the Cahu-
505 enga and the Verdugo hills and passing on down through this narrow neck and into the Los Angeles plain; when the water comes into this narrow passageway the movement would be somewhat accelerated beyond that in the lower portion of the San Fernando valley proper; I do not think that a cross-section at the west end of this land across the valley would show water moving in a uniform mass for the whole width; owing to the material that it is passing through, there are points at which the flow is greater and more rapid; the Pirtle development up there comes from the watershed of the San Fernando valley. I believe that any tunnel or cut run in below the saturated surface in the San Fernando valley will develop water and somewhat nearly on the same ratio as the Pirtle development owing to the material that it goes through; there is an upward pressure of the water near the hills that would give more water than the natural percolation or the sheet water of the valley would; the result on the surface flow of the Los Angeles river of lowering the plane of saturation would be to make the stream smaller; the plane of saturation of the San Fernando valley might be lowered 15 feet and yet water be in the Los Angeles river on account of the Cahuenga range of hills making a sort of dam there which would raise the water to something like the ordinary level anywhere.

Redirect examination:

The effect of draining the surface water of the river into filtration galleries would be to clarify it and make it better water, the greater the distance the better the filtration.

In my testimony I said that it would not be desirable to have stock pastured over the filtration galleries. For any of the ordinary purposes of agriculture or stock-raising, it is my opinion that
506 the water would not be affected at the depth to which it is proposed to construct this tunnel and filtration galleries.

When I expressed my opinion with regard to the amount of water that could be developed in the San Fernando valley, I had in mind the lower edge of the valley or basin. I meant a strip a mile wide in the same relative situation as the Pirtle development, extending from the Pirtle development down to the foot-hills and following that contour around.

JAMES T. TAYLOR was called as a witness for the defendants and testified that he was a civil engineer and that, in his opinion, it was not necessary to condemn the 312 acres of land for the purpose of constructing the proposed system of works.

The map referred to by witness Friel was introduced in evidence.

The defendants called F. C. FINKLE as a witness on their behalf, and being duly sworn, he testified as follows:

Am a civil engineer by profession. Been engaged in that business for nine years. Made a study of that branch of it which relates to hydraulic engineering. Have been in that practice of the

business entirely for the last seven years in southern California principally. Have been on the tract sought to be condemned here, in the employ of Messrs. Pomeroy and Hooker, with a view to making investigations of the lands that are involved in this action. First went up there on the 15th of February last. Have been over most of the tract, except the higher mountain sides. Have seen about all the channel of the Los Angeles river that flows through this tract. Knowing the amount of water needed for the city of Los Angeles, either at this time or for any future growth, having examined the land in controversy and tested it thoroughly, and having satisfied myself that it contained a quantity of water sufficient for those
507 purposes, there would be no difficulty, in my opinion, as an engineering proposition, to determine the character of the works and place of locating them, for the purpose of obtaining that supply. Having considered all of the conditions to be met, as well as the conditions of the lands from which the supply is to be drawn, as an engineer I think I could very easily determine what would be necessary to accomplish the thing in view. I think the first thing for an engineer to do, would be to make an investigation not only of what the city would need, but what could be obtained from the land under consideration. Having made that investigation, I could determine, as an engineering proposition, in advance, where to locate tunnels, filtrating galleries, settling reservoirs and collecting chambers for the purpose of obtaining that water. If the tunnel and galleries were constructed with the view to draw from the river, that could be done, and in that event a change of the river might have an effect upon the amount drained from it. But in that event the proper manner would be to construct the filtrating galleries or tunnels under the river, and not very much below the river. Only low enough to be safe from the scouring effects of floods, etc. The depth of five or six feet would be sufficient for that purpose. It would be a very difficult matter to construct a mere tunnel under that river that would draw all the water from it. If I wanted to draw the water off, I would construct what is known as filtration basins in the river. If that should be done and the river shifted its channel, it would have a material effect upon the quantity of water that would flow through there, but the water could be obtained again in two ways; you could either turn the river back to its former course, or extend or construct new filtration basins. As a general proposition, in most places the cheaper plan would be to turn the river back over the filtration basins, and in this particular place it
508 would certainly be cheaper to turn the river back. The condemnation of a line through there, upon which the river runs, and the right to maintain it in its course, would, so far as that scheme is concerned, meet all the necessities for the purpose of drawing the surface water of the river. If the tunnels or filtration galleries were laid at a depth of 10 or 15 feet below the river, then from the character of the material I don't think that any water from the river would filter in that tunnel. That is, any quantity worth mentioning. Nothing more than would filter away by evaporation and the consumption of plant life, even if there were no tunnel there.

In my opinion if the tunnels and filtration galleries should be at a depth of seven or eight or ten or fifteen feet below the surface of the ground, the purity of the water would not be affected by any of the ordinary uses of the land for agricultural or horticultural purposes, or stock-raising, or anything of that kind. I saw the cuts and the water that was developed in them, and there was nothing in the appearance or taste of the water that indicated that it was impure, or polluted by any causes of any kind. If the tunnels and filtration galleries were constructed to collect the waters that are percolating in the soil, I should say the plan of construction would be entirely different than in case the plan was to obtain the surface water. In the course of the development of percolating waters, you would have to penetrate the earth deeply. In case of simply to divert the water from the river by filtration into the tunnels, you would not have to penetrate only a shallow depth, that is, below the safety line; a line safe from erosions of the channel. For developing, I should say the deeper the better, so you don't go below the water-bearing strata. I know approxifately the elevation above the city of Los Angeles. You could go to a depth of about 30 feet beneath the soil and get up about 400 feet above sea level. At the
509 depth of 30 feet, I think there would be no danger of polluting the water that would be developed by any of the ordinary uses and purposes to which the land could be subjected in the course of agriculture or horticulture or stock-raising. As to the surface water, if the plan was to drain the surface water, the danger of pollution would be along the channel of the stream itself; and in order to protect the water against pollutions of that kind you would have to control the stream for a long way up; practically from the filtration basins up to its head. That is, where the water makes its appearance. The mere control of the particular tract of 312 acres, would not, in my opinion, furnish any protection worthy of consideration against the pollution of the surface stream itself.

I know the so-called Pomeroy and Hooker 1,400-acre tract. The mountains on the 312-acre tract are on the southerly margin of it, and they rise to an altitude of about 300 feet above the general level of the valley. The remainder of the Pomeroy and Hooker land to the westerly upon the Pomeroy and Ho-ker tract, is water-bearing land. If water were developed upon those tracts above the lands sought to be condemned, and on the lands still owned by Pomeroy and Hooker, it would only be possible to take water out of there by gravity on the south side of the river by means of tunnels through the mountains. I mean, of course, if you can't cross the tract that is to be condemned. You could not get out of there with the water or the surface without crossing that tract. The tunnel that I speak of that would be necessary to convey away the waters would be through the Cahuenga mountains and the cost of tunneling through there would, in my judgment, bar the possibility of it practically. As an engineering proposition it would be possible. On the north side of the river you could not make development on the land not sought to be condemned, and get out to the city of
510 Los Angeles, or to any place where the water could be used and disposed of as a practical and paying engineering propo-

sition without crossing the tract of land that is sought to be condemned. I know of no purpose or object for which the whole of the 312-acre tract is necessary, except to control the outlet of the waters above to the sections of the country where it is needed—the city of Los Angeles, the Cahuenga foot-hills, the slopes out to the east where that water would run by gravity.

In answer to question by the court, the witness said. I think if you wanted to control all the water practically from that watershed of the river, both percolating and surface waters, it would be a good thing to have the 312-acre tract sought to be condemned. That tract is a good tract to have for that purpose. I will state here, in distinguishing between the control and development of all the waters of that watershed, by control I mean you could practically control it by preventing anybody else from getting out with it, but you could not get it all yourself.

Cross-examination:

In my opinion this tract of land sought to be condemned, so far as controlling the watershed is concerned, is practically the key to the situation. It controls the watershed to a large extent. There is some water percolating northeast of this tract, but this tract controls a very large portion of it; most of it. I should say that the consequence of obtaining this tract of land, taking the effects on the upper portions of water-bearing lands above, would be to probably control at least three-quarters of that watershed. It might control slightly more. I think including all the discharge by means of percolation as well as the run-off of the river, that possibly there would be as much as 20,000 inches, under a four-inch pressure, discharged
511 by this watershed during the summer. I know in a general way the elevations of the land north of the land sought to be condemned, with reference to the elevation of the land west of them. The land rises towards the north and the San Fernando valley rises towards the north and west and the contours would run diagonally across the valley. If you make your development at a sufficient depth to make it effective on the land above, I do know that the water developed could not be carried through a ditch which would run along the north side of the lands sought to be condemned. If you developed right on the surface you would carry some of it out, but I know, in order to develop it, it must be developed down deep. I am not very familiar with the wet lands adjoining the river to the west of the lands sought to be condemned, say three-quarters of a mile. I am of the opinion that there is a small quantity that could be developed on those wet lands and carried out by ditches along the north line of the tract sought to be condemned, but it would be so small that it wouldn't pay to carry it out. I formed this opinion by walking over the land and looking at the contour map.

With the testimony of the witness Finkle the trial of the issues submitted to the court was concluded, and the remainder of the evidence herein stated was taken before the jury, and upon the

issues submitted to it, and the court having ruled that the burden of proof upon the issues to be tried before the jury was upon the defendants, the defendants opened the evidence in the case on the 6th day of March, 1896, and the first witness called by the defendants for the defense was

ANDREW K. NUDSON, who, being duly sworn, testified as follows: Am a well-borer by occupation. Have been engaged in the business of boring wells along the river in the Pomeroy and Hooker land on the tract sought to be condemned about two months.
512 Have bored six wells and kept a record of the various strata through which I passed.

Well No. one was bored on the south side of the river, ten-inch well. Got water at five feet from the surface. It was soil or sand down to that. From five to thirteen feet fine sand; thirteen to twenty-one feet, sand and some few boulders mixed; 21 feet to 21 feet six inches, clay, no water in the clay. Was water between the 13 and 21 feet. From 21 feet six inches to 29 feet, gravel with water; 29 feet to 30 feet, clay, no water; 30 feet to 62 feet 6 inches, boulders and gravel, good water; 62 feet six inches to 63 feet, clay. Was water from the 62 feet 6 inches raised about six inches in the pipe above the starting point above where I first struck it. That is when I struck that strata of water the water raised six inches higher in the pipe than it was before. From 63 feet to 65 feet, gravel; there I had a rise of water. From 65 feet to 69 feet, clay and cement, with boulders, no water in it. From 69 feet to 79 feet, gravel with water in considerable quantities; 79 to 89 feet, boulders and gravel, very coarse material, bearing good water. From 89 to 115 feet, gravel and boulders with water; 115 feet to 119 feet, clay, no water. From 119 feet to 123 feet, sand with water, but not very much. From 123 feet to 127 feet, clay and gravel mixed, no water; 127 feet to 145 feet, cement and gravel, no water; 145 to 165 feet, clay, no water; 165 feet to 176 feet, sand, apparently dry; 176 feet to 193 feet, broken-up granite, decomposed, no water; 193 feet to 205 feet, hard rock, no water in it that I could discover. That was the end of the well. The bottom of the strata bearing water was apparently at 123 feet. The surface of the ground at the point where that well was bored was at an elevation of between eight and ten feet above the surface of the river, as near as I could judge.
513 The point where that well was bored was from a half to three-quarters of a mile above where the ditch of the city takes the water from the river, and to the west up the river, and on the same side. That well is right at the head of the middle cut. When the water raised in the pipe, as I have stated, it did not subside immediately, but stayed there all the time and didn't lower until we punctured the pipe, or drilled a hole in it at the bottom of the ditch to let the water out.

Well number two is on the north side of the river about a quarter of a mile from well No. 1 in a northwesterly direction. In that well at four feet from the surface struck first water. Not very strong when I first struck it. From four feet to 31 feet, sand, bearing some

water; 31 to 59 feet, boulders and gravel bearing water in considerable quantities; good water.

By the COURT: Do you mean good quality of water, or a great deal of it?

A. Yes, a great deal of it.

From 59 to 62 feet and a half, clay, with no water. At every place where I struck the clay there was no water. From 62 and a half feet to 65 feet, sand and gravel with water. There I had a rise of water of about eleven inches in the pipe. From 65 to 101 feet, boulders and gravel; abundance of water; 101 feet to 106 feet, cemented boulders and gravel mixed; dry; 106 feet to 110 feet, clay, no water; 110 to 131 feet, gravel and boulders, dry. That is the end of that well. The depth of that well was 131 feet, and there was apparently no water below 101 feet, that I could discover. That well was situated to the northeast of the upper cut and about a quarter of a mile from it, as near as I could judge. It is about 200 feet from the channel of the Los Angeles river.

Well number three I sunk at the head of the upper cut. On Pomeroy and Hooker land. I mean the excavation. In that well, at 5 feet six inches from the top of the ground, I got water.

514 Went through sand 5 feet six inches to 15 feet; fine sand bearing water; 15 feet to 15 feet six inches, clay; 15 feet six inches to 19 feet sand, water-bearing; 19 feet to 20 feet 6 inches, clay; 20 feet six inches to 33 feet, gravel with water; 33 feet to 35, clay; 35 feet to 49, gravel and boulders mixed, abundance of water. This is a seven-inch well. That was the depth of that well.

The next well was sunk on the south side of the river, between a half and three-quarters of a mile below the first well, as near as I can guess. About two hundred feet from the Los Angeles City ditch. It is below the head of the ditch and near the cabin. From the surface down to 23 feet in this well found dry sand and soil; 23 feet to 25 feet, clay, and just as I broke through the clay at 25 feet I struck the water in sand and gravel mixed. From 25 to 41 feet, gravel and sand mixed, bearing good water. Forty-one feet is the depth of that well.

The elevation of the surface of the ground there above the surface of the river was about fifteen or eighteen feet. The level there is higher than where I sunk the first well above the surface of the river.

The fifth well is further down on the south side, about 200 yards lower down than the fourth well, and is on the mesa. From the top down to 18 feet dry sand; 18 feet to 21 feet, clay. At 21 feet I struck the water, and from 21 feet to 49 feet I had gravel bearing water. That was the depth to which I sunk that well.

The sixth well was lower on the south side of the river and it was north from the fifth about a quarter of a mile from it and on the river bottom. At four feet from the surface I got water. From four feet to 21 feet, cemented sand, without water; 21 feet to 66 feet 6 inches, gravel and boulders bearing water in considerable quantities; from 66 feet 6 inches to 77 feet, clay, no water; about from

77 feet to 82 feet, gravel bearing water; from 82 feet to 85
515 feet, clay; from 89 to 119 feet, gravel and boulders; 189 feet was the depth of that well. From 85 to 119 feet the gravel and boulders contained a good quantity of water; plenty of it.

Cross-examination:

I struck very little water at four feet from the surface of this well number six. Just the seepage.

Q. There was a little thread of water running by itself?

A. No sir, just seepage running from the ground. From 4 feet we had run dry again to 21.

Q. How wide was the space within which you found water?

A. You could not determine that; it might have been an inch or it might have been half an inch.

Q. But it was just a little stream of water running all off by itself?

A. No stream at all; just a little seepage in the sand. That came out of the ground. I could not tell which way it came from. It came from all sides. The cemented sand from 4 to 21 feet was impervious to water. Water would not seep into it at all.

The well that I punched the hole through and let the water out was the first one I made, and was on the south side of the river, which was 205 feet deep. I punctured the casing in the well right at the bottom of the cut. The well was bored at the head of the cut, and at the level of the cut I punctured the casing and let the water out. I did it because I had orders to do so. In that well I struck rock at 193 feet, and from that on to 205 feet bored through common granite rock, not solid, somewhat split up, you know. I think probably it was bed rock. Struck water last at 123 feet. From 123 feet to the bottom of the well, about 90 feet, there was no water. After the material was showered down and got in place, I don't think there ever has been any water below the
123-foot level at that place. The material that I found
516 in all the wells is not exactly the same. It varies a good deal. I cannot tell whether the clay that I struck lies in strata or not. All I know is just what I found. I punctured the pipe in that well at the level of the water. I made a hole about an inch and three-quarters long and about seven-eighths of an inch wide. The water was away above in the pipe, and when I punched the pipe of course the water spurted out and it lowered down to the cut in the pipe. I should judge the water stood in the pipe three or four feet above the puncture that I made in the pipe before I made it, and think the water ran down to the level of the puncture and continued to flow out of that hole all the time while I was there. It had a force to the flow while I was there, but I went away after making the puncture in a little while and did not return.

L. FRIEL, called as a witness for the defendants, being duly sworn, testified as follows:

Am a civil hydraulic engineer, and have been for 24 years; last thirteen years in Los Angeles county. Have been employed by

defendants in this action to make investigations of that section of country and of land particularly that is sought to be condemned, and have been in that business since the first of last December. Have made a map of that section from my investigations, surveys, etc.

The map is introduced in evidence and marked Defendants' Exhibit F, and is hereby referred to and made a part of this statement.

The witness continuing: This map was made under my direction from data furnished by me of the tract of land that is the subject of controversy in this action and sought to be condemned, and lies within the tracts surrounded by these colored lines and marked on the inside "Pomeroy and Hooker," in red letters. The parallel blue lines represent the Los Angeles river and its natural flow. The space marked Pomeroy and Hooker, enclosed in yellow, on the northern boundary, is the 22-acre tract at the south
517 side of lot 65 of the Providencia Rancho subdivision, and a part of the land in controversy. The first well bored by Nudson is marked "No. 147." About 300 feet south from the nearest point of the river, and is well number one. The second is located at the point marked "No. 134," about 150 feet north of the nearest point of the river. Number 3 is marked "No. 106," and is on the 22-acre tract, about 500 feet from the river. The blue line that flows through the 22-acre tract towards the northeastern part of it, represents a small stream of water coming from the northwest and flowing into the Los Angeles river, known as the Tejunga stream. The fourth well is at the point marked "No. 173," about a hundred feet in a southeasterly direction from the river. The fifth well at point marked "No. 194," about 800 feet from the river. Sixth well marked "No. 196," about 600 feet from the river on the south side. It is in the bend of the river. The ditch now used by the city and known as the city ditch, diverting the water from the stream at the point marked "headgate," is marked on this map. The dotted perpendicular line- with the numbers on them, indicate wells that have been bored on the tract of land, and also on the land adjoining. The figures on the map represent elevations above the sea level. The wells were what we term "test-holes." They have been bored and put down from the eastern end of the tract to the western, and the greatest distance apart is about 1,305 feet, and the shortest about 250. The figures contained in the square on the map north of the land in controversy represent block numbers of the Providencia Rancho subdivision, and the one in the southwest corner is block 65. Think the elevation of that portion of block 65 within the tract of land sought to be condemned is at an average of about 505 feet above the sea level. On the eastern extremity it is about 450
518 feet. The black lines, or hachures, indicate the mountains, the slopes of the mountains. To the foot of the mesa land or valley land of the San Fernando valley. To the mountains across the valley at the western end is about 15 miles. At the eastern end across the valley to the Verdugo moun-

tains about two and a half miles, at the narrowest point. The greatest elevation attained by the tract of land sought to be condemned on the extreme northerly point of it at No. 180, is 470 feet. The hills on the southern side of this tract are at an elevation of from say 25 to 300 feet above the land on the bottom; the valley land. The plaza in the city of Los Angeles is an elevation above the sea level of 200 feet. Water developed on this tract could be brought into the city and at an elevation of about 400 feet, by gravity. And I think about three-fourths of the territory in the city lies below that elevation of 400 feet above sea level, and the portion of the city found above that elevation would be on the unsettled hills mostly, in the northerly portion of the city. Am acquainted with the country to the west of the city, south of the Cahuenga range and sweeping off to the sea. All of that section of country but about 4,000 acres lying just south of the Cahuenga range of hills and west of the Los Angeles river, between Los Angeles and Santa Monica, could be brought under water developed on this land, by gravity. The area which could thus be covered is 50 or 60 square miles, a section 12 miles long by four or five miles in width. That section has no water, only some small water that comes from the Cahuenga range of hills, and wells. To the east of the city the whole of the Laguna ranch could be reached by the water from this land. The line of the tunnel proposed to be constructed by the city on the land in controversy is represented on the map by the red line, commencing at the eastern boundary of the tract and running in a westerly direction to a portion of block 65, clear through the tract longi-
519 tudinally, substantially. It is also marked on the map "Los Angeles city proposed main tunnel line." The proposed filtration galleries are located upon the map and numbered. The first one begins about 100 feet east of No. 193, on the line of the main tunnel, and runs in a northwesterly direction until it strikes the northern boundary of the tract in question, and is marked "Los Angeles city proposed lateral number 1." We have test-holes almost on the line of this lateral, within ten to forty feet of it after we get into the mesa land. The second lateral commences at a point between station 40 and station 50 on the main tunnel line, about 100 feet west of station 40, and runs in a northwesterly direction until it strikes the northern boundary of the tract. Its length is about 1,425 feet, and it is marked "Los Angeles city proposed lateral No. 2."

Lateral No. 3 is located, commencing at the same point as lateral No. 2, and runs in a southwesterly direction until it strikes near the southerly boundary of the tract in controversy, and has a length of about 920 feet, and is marked "Los Angeles city proposed lateral No. 3."

Lateral No. 4 begins at a point at No. 122, and runs in a northwesterly direction until it strikes the northwesterly boundary of the 22-acre tract, and is 1,100 feet in length, and is marked "Los Angeles city proposed lateral No. 4."

The hachures on the northerly side of the tract mark the line of

the mesa all the way along. The parallel blue lines indicated in Beuna Vista avenue, is a stream of water that comes down the Buena Vista avenue, and is carried in the Los Angeles river, and is also marked the "Pirtle ditch." It is the aqueduct that leads to the so-called Pirtle development. The names between the black parallel lines are names of streets and avenues. The markings in the southeast corner of the tract, wherein there are a number with numbers upon them,
520 are small wells that have been put down in the tract, a few feet or a short distance below the level of the water. The marking is the number of the well. The elevation of the land and the elevation of the water above sea level. The map referred to is entitled "Map of the water-bearing lands of Pomeroy and Hooker, situated in Ranchos Providencia, San Rafael and Cahuenga, Los Angeles county, Cal., L. Friel, C. E., scale one inch 150 feet."

And the witness continuing: I am acquainted with the cuts or excavation made on this land, within the last two or three months for the purpose of ascertaining what is the formation beneath and what it contains. There are two cuts, one at the eastern end and one at the western end, in the 22-acre tract. It is marked upon the map by two blue parallel lines, a small line at an angle. It is marked "Pomeroy and Hooker's lower development." That is the eastern. The western is the same description and marked "Pomeroy and Hooker's upper development." There is a cut near the well at No. 147 of this map, which is the first well that was put down by Mr. Nudson. That cut is about 290 feet in length. It commences at the circle at No. 147 and there are two parallel blue lines running in a northeasterly direction to the Los Angeles river. The circular mark indicates the spot of a well, and that is the well where the pipe was cut to drain the water away. The cut at the well is about 8 feet in depth and runs to about one foot and a half to the other end. The eastern development or excavation will average about 8 feet in depth and the western about nine feet. The length of the upper development is 600 feet, and of the lower 1,500 feet. There are two weirs in the Los Angeles river, marked on this map, one in the Tejunga and three in the Los Angeles city ditch. The upper weir in the Los Angeles river is located at the point of intersection of lateral No. 4 with the river, and is marked "weir." The other one is about 300
521 feet below the eastern side of the tract at the point marked "weir" also. The one I spoke of in the Tejunga is in there and is marked "weir," and by the side of it "No. 60." Of the weirs in the ditch one is at the headgate and is marked "weir No. 1;" the second is below, and is marked "weir No. 2;" the third is below the eastern boundary of the tract and marked "weir No. 3." Of this 312 acres there is a small portion near the southerly side of the block 66, that is in the Cahuenga tract. A small triangular portion in the easterly part of the tract that is in the San Rafael, and the rest of it in the Providencia. The Los Angeles river flows through a portion of each of these ranchos, included in the 312-acre tract.

Cross-examination:

I suggested the title of the map. The north line of the land sought to be condemned is also the north line of Mr. Hooker's and Mr. Pomeroy's property. They don't own property in blocks 66, 68, 69, 77, 78, 79, nor 80, north of this line. The map shows the north line of the 1,400-acre tract and the south line of this tract, as indicated by the map, is a line running up on to the side of the mountain, nearly all the way from 20 feet to 50 and 60 feet and higher. There is practically no level land south of this south line. There is a valley commences near the point represented as the round hill, and runs in a southeasterly direction, and is the valley that the road comes out of. The round hill is the one near the course marked "north 56 degrees 19 minutes east," and no portion of the land is laid down upon this map on a distorted scale. It is supposed to scale all the same, and the same both ways. The east boundary of this land is also the east boundary of Pomeroy and Hooker's land and is the east boundary of the Los Feliz rancho. The wells
522 and cuts have all been made recently, with a view to the purposes of this action. Tunnels and filtration galleries are laid on this map from the maps that were furnished and lines upon the ground. I don't know of any more tunnels or galleries proposed there by the city. There is a little mesa south of the city ditch. Haven't figured on the amount. That is about all the mesa on the south side, and you might say upon the north. All of the land is lower than the mesa or valley land to the north. The valley that I referred to south of the land sought to be condemned and southwest of the round hill, contains about 50 or 75 acres, which could be cultivated. Its elevation commences about 30 feet above the river and rises as you go south.

On March 11th, 1896, L. FRIEL recalled, who had presented and produced a map entitled "Map of the watershed tributary to the San Fernando valley," which is hereby referred to as part of this statement, and he testified: The map was made under my direction from Government and private surveys, and surveys that I have made myself. The map represents the city of Los Angeles, the plain lying between the city of Los Angeles and the Pacific ocean; bay of Santa Monica; the Cahuenga range of hills, the San Fernando valley or basin, and the watershed tributary to the San Fernando valley. The place marked "Los Angeles," near the southeastern part of it, adjoining the title, represents the city of Los Angeles. The broken line on the south side represents the charter boundary. The unbroken black line to the north of the line running clear across the city, is the township line running east and west. The little broken line, which is north of the heavy broken line is the patent boundary. The distance between the patent and charter boundary is about 1,800 feet. The large broken line extending around the exterior boundary of the map incloses the area of watershed that lies above the Pom-
523 eroy and Hooker land. That line extending clear around to the northeast corner of the red lines shows the exterior of that watershed tributary to that basin. The red lines, with which

the broken line connects at the northeast corner, is the line of the San Rafael rancho. The green lines to the southwest of the San Rafael are the exterior boundary lines of the Rancho Los Feliz, and the yellow lines in which is written "Ro. Providencia," are the exterior lines of the Rancho Providencia. The square in about the middle of the Rancho Providencia marked "Cahuenga," is the small tract of land known as the Rancho Cahuenga, or Cahuenga tract. The Little Tejunga creek is represented on the map and marked Little Tejunga creek, or Tejunga cañon. The blue line running southerly and almost parallel with the Cahuenga range of hills until it comes to the eastern point of the hills, and then southerly to the city of Los Angeles, indicates the Los Angeles river, and is marked "Los Angeles river." The line indicates the stream of the river about 14 miles westerly from the eastern boundary of the Cahuenga range of hills. I could not say whether that is as far back as the river course extends at present. The river rises or commences to rise at the foot of the Cahuenga range of hills, towards the western end of the Cahuenga range. The San Fernando valley runs north of the Cahuenga hills, west of the Verdugo hills and south of the San Fernando. The place marked Mission, with the figures 1031, represents the location of the Mission San Fernando and the elevation above the sea. The tract sought to be condemned lies near the southeasterly corner of the Rancho Providencia, a portion of it is colored yellow on the map and is marked Pomeroy and Hooker, and the other colored a reddish color, the 26-acre tract. At the western and southwestern extremity of the land. The spot marked "Lake" on the map, is a laguna
524 upon the western line of the Rancho Providencia, and about a quarter of a mile north of the Los Angeles river. The large figures on the map represent elevations above sea level. The road marked Southern Pacific railroad, is the line of the Southern Pacific to San Francisco. The map is constructed on a uniform scale of 2 inches to a mile. The place marked "Olivewood" and "Colegrove" are on the southern slope of the Cahuenga range, and not within the San Fernando watershed. The spot marked "Chatsworth well;" it is a well that it is said Mr. Nudson put down for the Chatsworth Park people. The place marked "Garnsey and Howell well," and "Forman wells," represents the location of wells bored by Mr. Nudson for those men.

The blue-shaded and yellow-marked "wash" with the blue line through it, is the place of the stream of the Tejunga cañon. The blue line represents the stream. The Arroyo Seco, as marked on this map, unites with the Los Angeles river inside of the city limits, so that the watershed of the Arroyo Seco does not empty its waters, so far as I know, into the San Fernando basin anywhere. The confluence of the Los Angeles river and the Arroyo Seco is six or seven miles south of the land in controversy. The various black lines on the map and the light yellow enclosed within some of them represent the sandy washes running from the northerly side of the San Fernando valley southerly. Those washes are only the portions shaded light yellow. The black lines are the banks of the washes.

I don't know whether there is any water at the place on western boundary line of the watershed marked "spring." I located that from Government maps. It is just about the line of the watershed. I think outside of it. The figures 500 in the Pomeroy and Hooker, tract, represent the elevation above the sea level. This is 500-feet contour line. Dundee and Roscoe are stations along the railroad.

525 Cross-examination:

The places delineated on that map are correctly located, I think, I know of my own knowledge of the greater portion of the watershed of the San Fernando, but I don't know all of it. I have taken the other from the Geological Survey and from the Wheeler survey. What I didn't know myself I took from Government surveys, as laid down on a map furnished by the Government in the Wheeler survey, and furnished by the Government in the Geological Survey. I procured the map from the Government offices. They are copies which are distributed by the Government on request to citizens. Have had experience in laying down points from these Government maps for the last three or four years, especially in the San Fernando watershed. Not especially in other places. Government maps of this class may be in general inaccurate, but I know in reference to this Geological Survey that it is very accurate. I know the points laid down here are correct. When I testified as to the points where the Los Angeles river rises, I meant the point at which the water first appears on the surface and flows. That is somewhere north or west of the Encina rancho. I could not locate the exact point at present, but about seven years ago I made a trip along the south boundary of the San Fernando valley, and west northerly around the head of the stream, and from my knowledge the river first shows upon the surface about 13 or 14 miles to the west of the tract of land sought to be condemned. My opinion is that most of the water, if not all of it, that is discharged from this watershed comes down and passes out through this narrow pass between the eastern end of the Cahuenga range of hills and the Verdugo hills.

526 Redirect examination:

Have made calculations of the areas of the different characters of land in the tract of land sought to be condemned. Acreage covered by the Los Angeles river is 11.50; mesa land, 48.50; second bench and willow bottom land, 210.42; the mountain and hill land, 18 acres; making a total of 288.42 acres in the Pomeroy tract, or in the larger tract. In tract number 2, of the southerly portion of block 65 of the Providencia, the acreage covered by the Los Angeles river is .35 acres; willow bottom and second bench, 26.05; a total in block 65 of 26.4. Altogether 314.82 acres.

Recross-examination:

I calulated the amount of acreage covered by the Los Angeles river as it existed on the day we made the survey about three weeks ago. By mesa land I mean the second bench of the land running

back to the mountain. Character is sandy loam in most places, nearly all of it. It is about 25 or 30 feet above the level of the river. The 210 acres I called bottom land or second bench and the greater portion of it is overflowed by the river, and when big storms come nearly all of it is overflowed; it is covered with willows and bottom grass. The soil is sand mixed with vegetable matter. From the south line of the land sought to be condemned at about Verdugo avenue, is about a mile and a quarter. To the mountains beyond that about nine or ten miles. From the south line of the land sought to be condemned in a northeasterly direction to the nearest point to the mountains would be about two miles and a half. Continuing the line as shown on the eastern end of the lower tract you would strike the Verdugo mountains about two miles and a half.

527 A. K. NUDSON, recalled by the defendants, testified: Have sunk other wells in the San Fernando basin for other parties besides Pomeroy and Hooker; higher up in the valley; scattered around in different portions of the valley. Bored a well near Chatsworth park. Kept a record of the different strata of some of them. Kept a record of the Garnsey and Howells wells, that I made for them. It was bored since 1893, but not within the past two years. The first well I made in San Fernando valley was in May, 1891, for a man by the name of Salisbury, and then various men since. From the top down to 28 feet I had sand and soil. At 28 feet a little water. This well I bored on Seventh street in the Lankershim ranch. That is in the San Fernando. I should judge about four miles in a northwesterly direction from the land in controversy. It is on the plain and north of the Cahuenga mountains. From 28 feet down to 56 feet I had clay and gravel mixed. From 56 to 89 feet I had water-bearing gravel. That was the end of the well. The character of the material that the water was in was sand and gravel. The lower down I got the coarser the gravel. That well is in use yet, has a windmill on it. I bored two wells for Mr. Foreman close to the lake, and a little north of the river, about two miles from this tract of land. From the top down to 19 feet sand and gravel, and little water at 19 feet. From 19 to 40 feet, cemented gravel and a little clay mixed once in a while; no water in that; 40 to 43 feet, clay, no water; 43 to 75 feet, sand and gravel, coarse gravel in the bottom and abundance of water. That is the first well, and the second one was just about the same material, only I went 69 feet. They were bored in 1893, in November. I bored another one, the same year, for a farmer up on Second street. Don't know his name, and have no record, except I got water at 22 feet and finished the well at 65. The wells I bored for this farmer are probably about three miles
528 from this land, and on Second street in the San Fernando valley, in the Lankershim division. About three miles from the station in a westerly direction on the north side of the river, and probably a half or three-quarters of a mile from the nearest point of the river. The next well I bored was at Chatsworth park for a man by the name of Brown, in February, 1894.

I don't know how near it is to the river. From the top down to 119 feet found sand and soil, few boulders, one streak of clay about ten feet thick; and at 119 feet found a little water. From 119 to 157 feet is gravel and clay. At 157 I got the second water in blue sand and gravel, extending down to 179 feet, and water all the way from 157 down. On August 29th, 1894, I finished a well for Garnsey and Howell, on the Maclay rancho, about three miles west of the Pacoima and five miles south of San Fernando. From the top down to 100 feet, I found soil and sand; 100 feet to 150, sand and some gravel and some boulders. At 150 feet got first water. From 150 to 197, clay and cement, no water. At 197 feet the second water in sand and gravel, and from 197 to 228, sand and gravel, with plenty of water, and stopped on top of clay at 228 feet. Those are all the wells I bored.

Cross-examination:

I found very much the same general formation throughout all the places where I bored wells. Varied a little. It seems the whole valley is very much the same ground. Got water up there at a further depth than on this land sought to be condemned. On the Pomeroy and Hooker land got water nearer the surface. Had more boulders on the Pomeroy and Hooker land and larger ones; and on the Pomeroy and Hooker tract first struck the water in sand. I got the water in the sand in these other places where I bored. It was after getting through the surface sand that I struck the
529 water on the other. I found soil and sand in Garnsey and Howell's wells down to 100 feet. Same soil as was right on top. Similar to the sand and soil on this tract. Some parts of this tract it is sandy, and on the other hand the soil was harder and freer from sand. Part of the Pomeroy and Hooker land was about the same, showing sand on top. That is on the mesa. I remember some on the mesa.

G. O. Newman was recalled as a witness for the defendants and testified as follows:

Am a civil engineer. Made a study of hydraulic engineering. Been engaged in that branch of the science since January, 1875, at Riverside, Orange, Santa Ana and Bear valley. Have investigated the Pomeroy and Hooker tract sought to be condemned in this action. Been at that since the last of November. Went on the land the 30th of November, last, and examined it all over. Directed what should be done to practically demonstrate my ideas of what water could be developed on that land. There have been two cuts put into the ground. One at the lower end of the tract and one at the upper, and after that put down a series of shallow wells to ascertain where the sheet water of that land stood, and how much it would be lowered by putting in a cut on the ground. The lower cut is 1,500 feet long, and the upper is 600. There were a good many wells sunk and a good many over a hundred. The wells were put down before the cuts were made. The watershed of the San

Fernando valley is something over 480 square miles. Have examined the cuts and wells that were sunk there for the purpose of ascertaining the trend of the waters moving underneath the surface of the ground in the Pomeroy and Hooker tract. At the upper cut we took a cross-section from these diagrams of Mr. Friel's to ascertain how much of that cross-section was drained by this cut. After we took and platted and geographically determined of the water as
530 would come in through that cross-section, and what course that would take to strike the ditch; and after we had ascertained the course of the water from that cross-section to intersect the ditch, we put in a weir there and carefully measured how much water had been developed through that cross-section. The amount is 35-hundredths of a cubic foot per second. We took before that and ascertained how much water that kind of ground could contain. I made several experiments of that, and found that a third of the material was water, so we took the actual water area, deducting one-third of the cross-section and got at the water area as moved in that cross-section, and from that we divided the area in the quantity of water as was running from the weir, and certainly that gives us the velocity in feet per second as that amount of water had to move. We can determine approximately the velocity of the water as it moves through the material that we found there. I am speaking of the velocity of the water after I made the cut. That is, you must understand that that amount of area as we could drain from that cut is supplied from the watershed of San Fernando valley, and this diagram shows that when you make a cut you lower the sheet water according to a certain curve, but you don't lower the water further back. You can only get out of such a cut as much water as is supplied from the valley adjacent. The experiments that I made demonstrated the velocity of the water after we made the cut. It does not show how the water was moving before we made the cut. This is not the velocity of the water in the cut, but the velocity moving in the ground after the cut was made, and near the cut. We have made some experiments and have put in these cuts to get at the velocity. Now, that velocity shows pretty large, a thing as I told Mr. North before we made these cuts, I said from the lay of the ground, it isn't alone the percolation
531 that has supplied the rate from the side I mean. The water must be pushed up and the experiments as I made here gives the velocity as shown to me surely that the water not only comes in from the sides and the end of that cut, but also comes up from underneath. That the pressure below has raised it to a certain height underneath, then it stops raising, and then flows off. I can determine approximately with what velocity it goes off, but I haven't done that yet. I have only ascertained the two different grade lines. From my investigations of that country the direction in which the waters of the watershed of the Los Angeles river make their way through the country, first it runs through the San Fernando until it strikes the hill on the south side of the valley, and then flows easterly along the foot of the hills. It strikes the Cahuenga range of hills all along the north edge of those hills, and

turn to the eastward pretty close to the foot of the hills, and the course of the waters through the lands which are in controversy. I should think it is most easterly. The contours of the maps show that some of the water comes in from the north side. I am speaking of the subterranean water.

Q. And then what course do they take after passing through the land?

A. It must follow in the trend of the river, along the lowest ground, in the same general direction as the river. It is my opinion that the most of the waters of the San Fernando watershed comes out through the gap about the land in controversy, between the Verdugo mountain and the Cahuenga range. It is my opinion that most of it passes through that, if not all. There is no other way to my knowledge by which they can pass out. I have examined the water records which have been handed me, and in my judgment the average rainfall from the area of the watershed that
532 supplies the Los Angeles river, from this point on the Providencia ranch, or the eastern portion of it northward and westward, must be about 24 inches, and according to my judgment about 19,000 inches of that should pass through that gap. I mean average rainfall of 24 inches, 24 inches of rainfall, and by 19,000 inches that pass through this gap. I mean inches measured under a four-inch pressure. I wasn't using the word inches in the same sense when I spoke of the 24 inches. That is rainfall. An average of 24 inches of rainfall would represent a constant flow for the year round of 858.7 cubic feet per second. I take out of that 45 per cent. as the amount which should go out through that gap. Fifty-five per cent. I allow for the run-off, and evaporation, and the 45 per cent. that would flow down through the gap as subterranean waters. There is average rainfall of 24 inches per annum. The volume of water that would be required to carry that off, measured under a four-inch pressure, running for the same length of time, that is for the year, is pretty close to 43,000 inches. I allow 55 per cent. now for the run-off and evaporation. That is about 23,600 inches, and leaves 19,300 inches, and in my opinion that amount passes off by this subterranean flow, through this gap. In what I call the run-off I include the ordinary stream of the river on the surface, that is, I include in that the ordinary flow of the water as the surface flow from the storm, and constant flow of the river the year round, and leaving 19,300 inches about, that passes through underneath the surface of the ground through this pass constantly the year round.

Have had experience in developing water in the Santa Ana river for the Riverside Water Company, and from looking at it and examining it over at Etiwanda, where they develop some. Am acquainted with the general plans proposed by the city of Los Angeles for the developing of the waters upon this tract of land. In my opinion
there can be developed by those plans by works constructed
533 properly, without diminishing the surface flow of the Los Angeles river at all, about 3,000 inches measured under a four-inch pressure. I have examined the manner in which the

water comes into these excavations, upon the tract of land in controversy, and the experiments that have been made in sinking wells upon this tract. The water in this particular ground seems to move in two directions. The water coming down from the San Fernando valley strikes the hills with one grade line, and after that by examining the top of the other grade line, we find that it goes off with a slower grade line; and certainly when we put in a cut in that ground, we can nearly get as much water as is supplied either from the side or from beneath to what cubic contents of ground as we can intercept with the cut. It flows or seeps into the cut from all sides and from the bottom, and after that flows down the cut.

Q. You spoke this morning of the waters coming into that cut by an upward pressure. What, in your opinion, is the cause of that phenomenon?

A. That the water as coming with a certain grade line strikes the hill, and after that has to move hastily on to another grade line, on a lower grade line, and certainly that is a tendency to raise that water up. That would not be so if the point at which the water coming in contact with the hills admits of an easier passage, than the material through this lower grade line, then it would move on the same grade line as it had before.

Q. Now, in your judgment, does the fact of the resistance opposed by this mountain also enter into the causes of the waters coming up from underneath?

A. Well, that is just what I said before. The water strikes that mountain and if it cannot flow off hastily there, it would raise above the top — the ground. But now, it moves hastily along the river but on a slower grade line, so that naturally it would
534 have to have a more rapid motion to be able to get through the same area. The water certainly comes from the whole of the valley there against those bluffs, and there we can see by the contours we have taken, or the levels of the different water slopes, that that water is crowded in there into a narrower passage, or to a narrower space, than what it had before, and consequently there it got to either travel faster through that material or it got to raise up.

Q. And the fact that it rises, does that indicate that it cannot travel faster through the material?

A. Well, it raises up and it travels faster, too. And at the point where it is raised up, it travels easterly. It is raised up on an average about three feet.

Q. How does the level of the subterranean water in this tract of land compare with the level of the stream of the Los Angeles river?

A. It is about three feet higher.

I know the well sunk by Mr. Nudson, in which, at a depth of about 119 to 123 feet the water was raised five or six inches in height. It is at the point marked No. 147 on Exhibit F. It is a ten-inch well.

Q. I will ask you, whether or not, in your opinion, or in your knowledge from the laws which regulate and govern the movements of water, the water would have raised or stood in that well if the

resistance met with by the material underneath was not greater than the amount of pressure necessary to raise the water.

A. Well, certainly, that well, as we have heard, was full of water almost to the top of the ground, and he came into the strata as raised that water some distance. That illustrates that the material that that water was flowing through underneath held the water back, and that it was easier for the water to raise up whatever distance it did in that pipe, than the pressure through that underground material. If, in boring that well, this machine had entered into an open, defined channel of water,

535 the water would certainly have gone off in the stream. In the cuts such as are there, you can go along the cut and see the water percolating in both from the sides, the end and the bottom. That is not confined to any one place, but is general throughout the whole length of the cuts. I measured the water in the cuts. In the lower cut we measured it in two places; in the upper cut in three. The lower cut is 1,500 feet in length. We measured the water near the head of the lower cut, and there were 25.53 inches. That is about 200 feet below the head. Right immediately at the head we didn't measure it. It is pretty hard to estimate very closely how much there was right at the head, because really right at the end of the cut there it first begins with a pretty fine percolation, and in a pretty short distance it increases pretty fast, and 200 feet below the head we found 25.53 inches, which was to ascertain how much the cross-section of the area drained would furnish that country at the head of that cut. At the lower end of the cut where we measured there was 121 inches. That was at the extreme lower end. The increase between those two points of measurement in the cut was a gradual increase all along the cut. There was no difference discernable at different points at all. I meant by that there was no place where you see water coming in any faster than in any other place; that it was a percolation visible all along the whole of the cut.

By the COURT:

Q. It came in, though, in little streams that you can see, didn't it?

A. Yes, certainly it gathered, and before it struck the surface of the running water it could go in little streams.

By Mr. CHAPMAN:

Q. Those little streams that you could see are simply the accumulations of the waters pouring in from the sides?

A. Well, certainly.

By the COURT:

536 Q. Are there not some places along that ditch where you can see that the water comes in more freely than it does at others?

A. In some place there, where in building the ditch was scraping

out, and these depressions where they went out with the scrapers, it is a little flatter than the general bank of the trench.

Q. I am not referring to those places.

A. And in these places you can see the streams gets a little bigger and looks bigger, but otherwise it is a pretty uniform increase all along the ditch. There is some little difference in the formation of the bottom of the ditch as to the size of the gravel and boulders and things. It may come out more freely where the gravel and boulders are larger than at other places where it is finer, but still honestly when we went along there to examine it, to me it appeared if there was any extra great flow some places there I would have measured it.

By the COURT:

Q. I don't mean any very great difference, but some difference so that you could notice it?

A. Yes, you can see that maybe it was percolating a little faster in one place than another, but still it is pretty uniform all along the ditch or trench. The first time I measured in the upper cut, I measured in two places, one at the mouth and the other half way up. There was 76 and a half inches at the mouth, and 32.7 in the middle. At a later date I went up there to measure to ascertain the rate of velocity. Then we measured near the head of the cut and made it 17.97 inches. That was 170 feet from the head of the cut. The first measure in that cut was made on February 16th, and the last one on March 1st. At this last measurement I didn't measure the flow at the other places to ascertain whether there had been any diminution of the last measurement, any perceptible diminution, but at the lower cut I measured one other date to ascertain if it was any different and it was virtually the same. The increase in the upper cut was from 17 inches to 76 and a half inches. That is, the
537 17 inches at 170 feet from the head, and 32 and something about the middle, and the cut was 600 feet long. I have been all along that cut, and the rate of increase of water flowing in the cut is very gradual. It shows. The measurement in the middle is approximately half what we got at the lower end. I have been around to most of the wells that we bored. I have not been to every one of them. There was water in every one that I looked into, and every time I looked, and I looked at that most every time when I have been on the ground, extending from February 15th to yesterday afternoon (which was March 10th, 1896). I never saw them when water was not standing in them. Independently of the cuts and the wells that were bored, I could determine from the general appearance of the country there whether there was water in the land or not. I was satisfied when I went on the ground on the 30th of November, that there was water, and the question was how to be able to show to some one else that there really was water in there. The indications that satisfied me there was water, was the topography of the country, observing the Los Angeles river. I observed both in the sides and bottom of the river how the water was percolating into the river. I made some measurements of the

quantity of water flowing in the Los Angeles river myself. On the 15th of February there was flowing in the Los Angeles river at the western boundary of the tract of land in controversy, 1,068 inches, measured under a four-inch pressure. That was near the upper end of the land and below the mouth of the Tejunga creek, and about 150 or 200 feet below the mouth of the upper cut, and only a short distance from the western boundary of the land in controversy. At the point where the Los Angeles river leaves the land in controversy, at the eastern boundary, there was 2,057.9 inches. I have not been all along the river, but I have seen it at very many points along
538 this land. There is a small surface water comes flowing into the Los Angeles river from the western boundary of this land to the eastern. It comes in from the north side, right under the bluff of the mesa land there. There are only about seven or eight inches flowing in it. That is to my recollection about the middle of the Hooker tract, half way between the two cuts. This Pirtle development water is running into the river in two places on this land. What they call the west branch comes in just a little below the upper weir, and there was 70.75 inches, and from the east branch 202 inches, making altogether 272 and $\frac{75}{100}$ inches. The difference in the amount of water flowing in the Los Angeles river at the points where we measured it on the western side and at a point on the eastern side, is 989.89 inches, and the increase from sources other than the surface flow into the river is practically 700 inches. The water which was running in the ditch at the same time was 473.06 inches. That is not included in the 2,057 inches, but is to be added to it. The total increase, taking out what was coming in and what was taken out between the western and eastern boundary, is 1,081.63 inches. The water that was flowing in the ditch when I made the measure, continued to run when I made the measurement at the lower point. The thousand and eighty-one and $\frac{63}{100}$ inches of increase, according to the measurements, take into consideration the 473.06 inches, which was diverted by means of the ditch. The elevation of the Pomeroy tract on the westerly line is 493.12 feet above the level of the sea, and on the easterly, 450.7. Of the 19,000 inches, measured under a four-inch pressure, furnished by this watershed, and which constitute the subterranean flow through that gap, I should judge at least two-thirds of it flows through the tract of land in controversy, and the remaining one-third passes out to the north of it.
539 The shortest distance across this narrowest opening between the Cahuenga range and the Verdugo, is about two miles. I know where the ditch that is used by the city of Los Angeles connects with the river upon the Pomeroy and Hooker tract. The head of the ditch is near the center of the 314-acre tract. It is about 2,900 feet below the upper cut, and about 1,500 feet from the head of the lower cut to the dam by which the water is diverted into that ditch. The ditch is about 170 feet from the cut at the nearest point. The effect of the flow of water in that ditch in increasing the quantity of water into this lower cut, is certainly very little, if any. I was up on this ditch yesterday (March 10th). There was 48.9 inches flowing in it at the headgate, and in the

ditch at or opposite this lower cut due west from the upper end of the cut, there was flowing in the ditch 22 and a half inches. I observed the water flowing in the cut at the same time and could not see that it was affected any. We had to take a weir from another place and put it in, and we could not get it down. We had to set the weir pretty high so that we had to back the water unusually high, and still it measured 115 inches in the cut, instead of 121. It got late and we didn't want to wait for it to raise, but I was satisfied that there was just as much water in the cut now as there was when I measured it in the cut, but at which time there was 473 inches in the ditch. We backed the water up to this weir in the cut between 450 and 500 feet. That had some effect upon the percolation from the sides into the excavation. The effect would be to diminish it. The cut is a little over 200 feet from the river, at the nearest point, and where the river makes a bend towards the cut. The water in the lower cut is not, in my opinion, affected by any flowage or percolation from the river. The reason I
540 think so is because the water of the saturated plane stands fully three feet higher than either the water in the river or in the cut.

Q. At what place does it stand three feet higher?

A. Between the cut and the river. I observed that fact at more than one point. At every cross-section, at every place where these rows of wells shown on Exhibit F, it shows in every one of them that the water stands higher in the ground than between the river and the cut. I do not think the water that is percolating into the upper cut is affected by any percolation from the river or the Tejunga stream. I think so far the same principle as is shown on the lower cut. The same kind of wells is put in across the upper cut that is in the lower cut, and the water stands higher between the Tejunga creek and this cut, and higher than between the cut and the river. I have estimated the cost of developing 3,000 inches of water in this land by such works as would be necessary or proper to avoid lowering the quantity of water in the Los Angeles river, and in my opinion it would cost about $100,000. In all my investigations I have not found any such thing as a defined water course or channel in which water is flowing beneath the surface in that section, as far as my investigations went. There is about one-third of the material of the earth there that is water, that is upon this Pomeroy and Hooker tract, and of the ground such as we found it in the bottom of these trenches. Am acquainted with the values of real property, and I know the value of water for irrigation purposes, and I should say that there is no question but that water is worth at least $500 an inch, and as I measure that there could be 3,000 inches developed from these galleries, 3,000 inches at $500 an inch is one million five hundred thousand dollars. In making that estimate I mean it is worth $500 an inch on the land undeveloped.
The amount of water flowing into the city ditch would not
541 have any effect upon the amount developed in the upper cut, and the amount developed in the lower cut is 121 inches, and

in the upper 76 and a half. The upper development produces a greater amount of water per foot than the lower.

By the COURT:

Q. Mr. Newman, I want to ask you one question before the cross-examination begins. When you speak of a well-defined stream of water under ground, what do you mean?

A. A stream that has banks and bed and flows like flowing water does.

Q. Then, according to your idea, there is no such thing as a well-defined stream under ground, unless it is flowing in a cavity in the rocks or something like that?

A. No sir. Not to call it strictly an underground stream.

Q. You don't recognize any stream of water flowing through coarse gravel or any flowage of water through coarse gravel, as a stream at all?

A. No sir; it is not a stream.

Q. That is percolating water

A. Yes, sir.

By Mr. CHAPMAN:

Q. Well, I will ask you as supplemental to that, do you, in your definitions include in a water-course anything that is only one-third water?

A. No sir. You can't call that a flowing stream.

Cross-examination by Mr. DUNN:

All of this land will not alike contain one-third water and two-thirds other substances. There may be a little difference in that land. There are large bodies of this land under ground that contain almost no water, and others that contain much more than a third. I gave the number of square miles of this watershed at 480, and upon that watershed I based my figures. The rainfall per annum on the watershed, the average, I gave as two feet. I took that from the statistics here at Los Angeles, average 17 inches and from what I know of the amount in radius, as it is fully doubled up at Arrowhead and 542 at Bear valley, what falls up in the mountain, as compared with what falls in the valley. The area in the mountains is about three times as much as—or two-thirds of what it is in the valley, consequently there is—twenty-four inches is, in my mind, the minimum average rainfall. The 24 inches is, in my opinion, a conservative estimate. Following out my argument, thirty inches would come nearer to the figures. That would just about be the figures, and that being the case, the amount of water run- through this valley would be greater than 19,000 inches, measured under a four-inch pressure; it would be a fifth more, or practically 25,000 inches, and about two-thirds of that runs through this land, in a general easterly direction; following along the contour of the mountains, or of the base of the mountain. Follows a direct line as near

as the mountains will permit. I have not considered what the effect on the amount of water produced would be if the cuts were made crosswise instead of lengthwise of the tract. If I should lay out some tunnels therein to develop water on that tract, I should usually lay them lengthwise of that land. If the cuts were crosswise I rather think you would get less water. One cut would cut off some of the supply for another if you put them close together. If you were to build a dam to bed rock across the eastern end of this land, and run a spur of that dam up to the Verdugo mountain, following the bed rock would very likely get all the water in this watershed. If you would run such a dam around the upper end of the Pomeroy and Hooker land you would not catch two-thirds of it. Some of the water would be forced to go around the dam and go through the balance of the space in the gap. After the water comes out of this land the direction of its movement is easterly. I can't tell what proportion of that water that comes into the land comes in from the foot of the hills and what proportion comes from up above down into it directly
543 from the north. The greater portion of all that water has got to strike that hill before it begins to turn. I think the greater portion of the watershed strikes the hills west of this land and follows the same general course that the surface water does, along the base of the hills. I can't tell what proportion of 15,000 inches that comes into this land, comes from the north and what comes from the base of the hills. The water in the Pomeroy and Hooker tract, in my opinion, above the plane of those cuts, moves between 14 and 17 miles per year. That estimate is made on the ground that lies above the elevation where this lower cut enters the river. That is the only land that we have been able to examine, as all of the land lies above the elevations where the lower cut enters the river. How fast the water travels below that I don't know.

By the COURT: Now, I understand he don't mean the water that lies above that in the river, above that geographically, but above that vertically.

A. Above that horizontal plane, or above that plane as we can intercept it by running in a tunnel. The water then which the city would intercept in putting a tunnel in, in my opinion, moves from 14 to 17 miles a year. That tunnel would be at the upper end, about 32 feet in depth, under the water plane, and the water which would be intercepted at that point would run from 14 to 17 miles a year. At the point where the tunnel is 32 feet below the water plane, it is a little below 40 feet below the natural surface of the ground. There is some water yet in this ground below the proposed tunnel. The wells have shown that there is water further down than 40 feet. The water in the San Fernando valley comes from this same watershed; comes into its position or place in the same manner that the other water does; runs through about the same material. They show in some places a little coarser material. The mate-
544 rial seems to keep changing, lays in strata. That water that moves down the San Fernando valley, I could not say if it moves faster or slower, because it has a much greater body to move through. The grade line shows there that it has a heavier grade

than the one down below. Whether it would move faster in that case depends on the resistance in the ground, and that depends on the material it would travel through. It would move faster in the same material where the grade line was greatest.

Q. Well, the material, as I have said, through this tract, is about the same, isn't it, all of it, that is, it will run in a general way about alike?

A. Well, you can say in a general way. Still, we have seen by our borings and the level of the water especially from the bigger wells, that the grade line of the water coming down the San Fernando valley has a broken grade line, and certainly that is only on account of the different resistance that it meets. It is shown by some of these deeper wells that some of the strata are perfectly impervious. In making my estimate I have not figured at all as to the amount in which water would run freely, and the amount which was impervious to water. The way I went at it; I took the increase in the lower grade as that was the smallest, and after that I extended that increase up through the water-bearing strata, and as I found by plotting from this observation of Mr. Friel's, and that that increase when I plotted it, made exactly a straight line. Take a string and lay over them points and it was exactly straight. Well, then, it was very reasonable to suppose that I could carry that increase on in that same ratio through that water-bearing strata. I can't tell how much of the ground above bed rock, between bed rock and the surface, is water-bearing and how much is impervious to water. There are layers or streaks of water-bearing soil and then possibly a streak of cement, sand
545 or clay. The water-bearing soil is composed in some instances of sand and gravel and in others of boulders and gravel. The water flows more freely in some of these strata than in others and I think flows the more freely in the coarser material. Have not approximated in my mind as to the amount of this coarse material. There may be many causes that the Los Angeles river flows on the surface. In some places where these underground stratas—where the water percolates through it, strikes a more compact material, and it has got to raise up to seek more ground to percolate through, and if that more compact material is enough of it, it will shove it clear to the top of the ground, and it will begin to flow as a flowing stream. That is one of the causes that may account for it. Again, it may be that where a river has a big inclination like the Los Angeles river, it may be that it cuts some of these water strata as we know is separated by little clay strata. It may be possible that it cuts off one of them, and that they empty right out into the stream on account of the inclination.

Q. You mean one of those water-bearing strata that you speak of?

A. Well, some ground where the water percolates freely through. Either freely or slow. But when it is cut, it will show on the ground.

By the COURT: You mean where the inclination of the stream is greater than the inclination of the strata?

A. Yes it would cut them. This water of the Los Angeles river

has all of it been under ground in this water plane, I think, and has come up from them by reason of the various causes that I speak of, and shows on the surface. The bottom or bed of the river through this land is mostly sand. It is undoubtedly water-bearing itself. Right in this particular place you can see the water percolating into the river from both sides and from the bottom, so that the strata
546 under the ground immediately under this river in this land is full of water and is forced up through it. If it was this same loose gravelly material, and there was no water in it, the river would sink down into it. I have never been in the vicinity of the Los Angeles river during a time of flood. Have formed an idea of what the run-off from storm water would be, from this watershed in a flood. Base my figures from general observation of other rivers. We have a river right at Riverside very similar to the Los Angeles river, that is the Santa Ana. It comes up very suddenly, carries an immense quantity of water, and inside of a few hours is down again. Have seen the bed of the Los Angeles river and the levees, as it runs through the city. Have not measured the width, but should judge it must be 400 feet. Estimated the velocity of the river in flood time to be ten feet per second, the width 300 feet, the depth of the water ten feet, it would flow 30,000 cubic feet per second, which would be one million, five hundred thousand inches, under a four-inch pressure. When the water flowing under ground comes into this land on one grade line and then out on a slower one, as I testified, I meant that the grade line of the San Fernando valley of the water plane, as we have got it from these different borings, that it is nearly double as it is moving in the other direction. Then the effect of that upon the velocity is if the water don't raise clear to the top of the ground and flow a living stream, it has got to travel faster through that material. It has got to get away one way or another. The 13,000 inches flowing underneath the soil, as has been stated, of this Pomeroy and Hooker land, may flow faster or slower after the grade line is lowered. It depends on how far it spreads out again, how deep it is. It may be so deep that it don't travel any faster when it gets underneath. If the bed rock is the same depth, it has got to travel faster. If you
547 crowd it into a smaller place, it has got to travel faster. When I call that a slower grade line, I meant it was not so steep an inclination. In examining the cuts I can't tell whether the greater quantity comes into the cuts from the sides or from the bottom. It comes in from the bottom all over. You can go along and see little white pebbles jumping in the bottom of the cut, showing that there is streams coming in from the bottom as well as from the sides. These places where you can see it are quite numerous. I could not tell whether they are every inch, or every three feet. They do not exist everywhere within an inch of each other. You may see those bubbles every 12 or 15 feet. It does not bubble out so strong. It comes in from the side about the same way. It is just as you can see the motion of the bubbles. Seems to percolate in pretty gradually all along. You can't see the same motion in the bottom that you can on the sides. On the sides you can see the

water coming right out and see it flow, little rivulets coming into the main stream. I spoke several times of the fact that the water plane between these ditches and the river was higher than it was either in the ditch or the river. The reason for that in my opinion is the fact that this water coming on this heavy grade line and having to go off on a slow grade line, kind of piles up there to find space enough to travel through and certainly it is kind of upward motion, as it strikes the foot of that mountain, and has to turn and go in another direction. And as it shows both in the river and the cut that water keeps coming up from the bottom. I know that you don't generally see that in the ground where it don't exist under a pressure. There is a point where that ditch and the river are only 200 feet apart. The lower ditch or excavation, and still the water plane between the ditch and the river is three feet above either the ditch or the river.

548 Q. Will that stay so if that ditch is left there?

A. It has stayed there now for about a month, and has not changed. If anything, it is raising higher just lately. And, in my opinion, that water plane will stay very nearly the same. The water at the point between the ditch and the river where it is three feet higher than the river, is moving. Moving along at the same general rate as the rest of it, and in the same general direction. I got the rainfall from the Government Weather Bureau in Los Angeles. I don't know what the rainfall in San Fernando valley is, as a matter of fact. Haven't seen the statistics in the San Fernando valley. Assumed that the rainfall in the San Fernando valley was something near the city of Los Angeles. I compared the valley with the mountains such as we have it over in San Bernardino valley. Have heard there was a rain gauge in the San Fernando valley somewhere, and that they have been trying to get hold of it, but I didn't find out what it was. Never read Hall's report of the rainfall in that valley nor consulted any statistics of the rainfall up in that valley. I started on the basis that the San Fernando valley had 17 inches of rainfall and that the mountain area had twice as much rainfall; that two-thirds of the whole shed was mountain area; that the area of rainfall in the mountains was two-thirds of the whole area. If the rainfall in the San Fernando valley were 11 inches, my figures would come down accordingly. In figuring on a mountain rainfall, I have based my figures that it is twice as great as in the valley, from what I have observed now for years, both in the Bear valley and Arrowhead. Bear valley is 4,600 feet above the sea-level and Arrowhead a little less, but don't remember just what. The San Fernando valley is 6 or 7 hundred feet and keeps going up from the lower end of the valley. The San Fernando valley is higher than the city, and for that reason I thought
549 it safe to assume that it would have a little more rainfall.

Am not familiar with the rainfall in the territory east through the Soledad cañon above San Fernando. Know of no observations or records there. I only know that it comes down there in big water-spouts sometimes, but don't know the annual rainfall. In my

estimate that 3,000 inches of water could be developed upon this land, at a cost of a hundred thousand dollars, the general plan upon which I would build those works would be tunnels, or open cuts, following to some extent the plan laid down upon that map by the city in a general way. The city seems to have planned to draw from the river, and if it should be developed independently from the river, you would have to change the plans somewhat. To change the plans so as to draw from the river, I would locate new tunnels, so far as I could from the river and where it came anywhere near to affect the river I would make the tunnel tight. I have not given close study as to just where to put the tunnel. All I can say is I would try to get it as far from the river as I could, without I wasn't wanting to draw from the river. I would put it on about the same grade as the city proposes, because, that is to — mind, a proper grade line. About 32 feet below the water plane. The tunnel which I would put in would affect the water plane in different shape in different places. It don't affect it the same all over, because we are at different depths underneath. If you were running a tunnel 32 feet under the water plane, lengthwise of that land, you would affect the water plane on each side of it something like three or four hundred feet. These wells we put down along those cuts were put there to get at the curve that water takes from the water plane, to see what ground absolutely would be drained by cutting into the land.

You see the whole of them shows that this curve goes back for a
550 certain distance and gets a little longer according to the depth.

That is supposed to be an open cut. In estimating that the cost of the works would be one hundred thousand dollars, I have a general system in my mind and that system would provide for one big main tunnel that would run through the land and be so built as to receive water itself. From that tunnel I would run filtration galleries. I could not tell just how many to obtain that supply; it would depend on what I wanted to do with it. I figured roughly that such a tunnel would cost $12 a running foot. In my opinion the main tunnel in the city plan would drain water for about 200 feet at least on each side of it and would lower the water plane accordingly. If you were to parallel this with another pipe 600 feet from it, at the same depth under the saturated plane you would get the same amount of water, and if you were to run another tunnel parallel with the first and second and 600 feet from the second, you would likely get the same amount of water, and so on with other tunnels 600 feet apart, keeping the same depth under the water plane. You would not affect the flow of the Los Angeles river by building so many if you keep far enough away from it. If you would run under the river you would have to shut up the tunnel for 250 feet each way from it or you would affect the river. If I were building a main supply tunnel every time I came within 250 feet of the river I would make the tunnel water-tight if I were 32 feet under the surface. I think the city plan would develop 3,000 inches of water on this land and that this is all that could be practically developed. I cannot tell off-hand even roughly without figuring a little how much water of the proportion of 3,000 inches would run in

the main tunnel because it is only some few feet underneath the surface and it is a pretty long distance. It depends upon who is taking and how it is done whether
551 if you should develop 3,000 inches you could duplicate it by putting in pipes at distances of 600 feet from each other and thus develop 6,000 inches. If I were doing it I would have to keep away from the river: it might not be policy to run them in so close because it would cost too much to protect against getting the river water in. If the city was doing it as owns the river, well, they could stick in a good many more. On these plans you would certainly take in surface water, you could not help it. I would protect the galleries in my plan so as to make them tight where I was in the neighborhood of the river.

Redirect examination:

From my observations and experience the amount of rainfall in one locality differs very considerably from the rainfall over another, not very far distant from it, from local causes, and if it were a fact established that at some particular point in the San Fernando valley the average rainfall did not exceed 11 inches, or was not as much as 17 inches, it would change my opinion much. If it was just one spot, or observed at one single place. I know, as a fact, that it is a general rule that there is greater rainfall on the higher elevations than on the lower ones. The course of the Los Angeles river in the San Fernando valley is pretty nearly due east, and when it passes through this narrow space between the Verdugo and the Cahuenga, below the land sought to be condemned, its course is southeasterly. The San Fernando basin to the westward and northwestward of the land in controversy is of a higher altitude than the land in controversy and the land sought to be condemned is of greater altitudes than the main portion of the city of Los Angeles.
If there should be any such thing in some places in the
552 San Fernando valley as an average rainfall less than the average in the city of Los Angeles, I should say that it was due to some local causes. It would not be in consonance with the general principle. The depth of the tunnel proposed to be constructed by the city is about 32 feet below the level of the water plane at the extreme upper end; at the lower end it comes out on a level with the river. In progressing towards the head, it has a pretty uniform grade. The bottom of the tunnel would be one foot to the thousand feet. In the depth that I spoke of, therefore, it would vary from nothing to 33 feet below the water level, and at a grade practically uniform.

Recross-examination:

The water plane on profile "F F" is affected by the city ditch, that cut is about 5 feet below the water plane and affects it about 210 feet towards the river. If you were to cut 32 feet into the water plane there it would affect it for about 1,000 feet back. I was not mistaken when I testified before that a cut 32 feet into the

water plane would only affect 250 feet because in certain strata it would only affect the water plane that distance back, and to figure on that theory did not amount to anything; my general idea that the average as to how far back this water plane would be affected by tunnels laid 32 feet under the plane is about 400 feet judging from these different experiments made.

F. C. FINKLE was recalled as a witness on behalf of the defendants and testified as follows, after testifying to his qualifications as a civil and hydraulic engineer and the length of time he had been engaged in the practice, and his experience in southern California, which has been for about nine years:

553 Most of my experience has been in Riverside and San Bernardino counties, and has been in the way of water development and for the construction of works for conveying water off to other portions of the country. Have been on the tract of land sought to be condemned here, in the employ of Pomeroy and Hooker. Have been engaged in that investigation since the middle of February of this year. The conditions which I found there are similar in many respects to other conditions with which I have been identified. I have been engaged in other places for developing waters in very considerable quantities, and have been employed in the determination of the quantities that can be developed by particular systems of works. Have had much experience in that. I saw the wells that were bored on the tract of land in controversy, and I have seen the cuts that were made there. I have looked into the elevations of the lands sought to be condemned, and above them higher on the stream. The sources from which, in my opinion, the waters which are moving in the soil there and the sources of the Los Angeles river, are supplied from the watershed of the San Fernando valley, which has an area of about 485 square miles above the land in controversy. Very nearly one-third of the whole watershed is in the San Fernando valley. In the mountain portion of the watershed the drainage flows down the course taken by the different cañons, which are very numerous. The topography of the mountain sides is very precipitous and steep and the slope of the cañons is also very steep. The surface is very rough and uneven. After the water descends from those ravines on the cañon sides, it is discharged into the San Fernando valley and the exact direction taken by it depends somewhat upon its quantity. If the quantity is very large, so that it cannot all be absorbed by the basin of the San Fernando valley, the surplus is carried off in a manner which is determined by the contour of the top of the valley. That is whatever the surface water may

554 be, which does not sink. The water which does sink and moves underneath the surface of the land, moves from the edge of the mountains with the general direction, in my opinion, first is southerly, and as it reaches the lower levels of the valley it is gradually deflected in its course and towards the outlet it takes a more southerly direction. The principal cause of its deflection is the range of Cahuenga hills, which bounds this valley on the south.

They have a tendency to form a vortex, you might say, and turn the water in lines which are parallel to it. The inclination of the water plane above the place where it strikes the sides of the mountain is greater than that pursued after they are deflected to the eastward. After it strikes the mountains and moves to the southeasterly, in my opinion, it must pass through the narrow outlet between the Cahuenga hills and the mountains to the north. All of the water from this watershed, in my opinion, passes through there, except what evaporates either as surface flow or as underflow. I think I know something of the rainfall in this section of the country from the records which I have examined. I have taken particular note of it in my personal observation, no other places where I have resided in southern California. The average rainfall, according to the records and statistics at the city of Los Angeles, is something over 17 inches per annum. It is 17.16 inches per annum in San Bernardino on an average, from 1871 to 1889. At Pasadena the average from 1883 to 1893 is 23.95 inches. The altitude at Pasadena is at least 250 feet higher than Los Angeles. I don't know exactly. It is only a guess. I know it is higher. The records in Los Angeles from which I have taken this average is pretty nearly 20 years I think. It is the same average that is given in those bulletins distributed by the Weather Bureau here, around town. I think it covers all the years they have made observations. From my investi-
555 gations and researches the rainfall in the mountain watersheds is approximately about twice what it is in the adjacent valleys. I have made estimates of the amount of water that falls upon this watershed, and I have placed the average at about 24 inches, which I think is a conservative, fair average. In miners' inches, measured under a four-inch pressure that would represent about 42,847 inches of constant flow during the year. In my opinion about 53¼ per cent. would be the right amount to allow for storm run-off and evaporation and supplying the needs of vegetable life. That would be equivalent to a constant flow for the year of 22,852 inches, under a four-inch pressure, and that would leave 19,995.4 under a four-inch pressure of the total rainfall. In this run-off I have not included the normal flow of the Los Angeles river. I have included only the storm run-off. The normal flow of the Los Angeles river at the lower end of this tract of land, I should think, would fairly average about 3,000 miners' inches, during the entire year of the ordinary run-off. Not including the flow-off of the storm water. I have measured it up there twice this winter. Measured it in the month of February and the first of March. Just below the line of Pomeroy and Hooker's land which is sought to be condemned, not over 50 or a hundred feet below, there were about 2,140 inches, measured under a four-inch pressure. At the upper line of the tract, measured on the same day, and near the Tejunga, there were 1,663 inches in the river. At the time I measured the water at the eastern extremity of the land, the water was running in the ditch used by the city, and there was running there 473.6 inches. That ditch taps the stream between the two points of measurement. That was the measurement made in February. There

have been no rains to speak of this winter before the 15th of February. I don't know just how long before that measurement was
556 made. There has been some rain since. I don't know how much fell in the city. I next measured it March 1st, 1896. I found flowing in the river 1,588.5 inches, but there was a large quantity diverted by the city ditch. I measured the amount diverted in the ditch and it was 929 inches. Measured the ditch the same day that I found the 1,588.5 flowing at the lower end of the land in controversy. I measured the water in the river at the upper end of the tract at the same time, and there were 1,087½ inches. That was above the point where the ditch taps the river. The temperature affects the amount of evaporation. I have observed the streams of southern California in the fall of the year, before the rains began, for the purpose of noting whether the flow increases before the rains commence or not, and in some cases I have found that the stream would increase before the rains, and in others fall off, it depends on the physical conditions of the watershed. I have, from my investigations, made an estimate of the velocity of the water moving under the earth of this tract of land, and its immediate vicinity. In my opinion the average velocity as determined by experiments made in this tract under consideration, is given by one experiment as 17.32 miles per annum, and by the other 14.31 miles per annum. These experiments were made at different places on the tract. I don't know what the mean rainfall of the winter of 1894–'95 was. I think it was greater than it has been this year. It was greater in San Bernardino. I say that the normal flow of the Los Angeles river the year round at this land would be an average of 3,000 inches. That is an outside figure. It undoubtedly flows more at some times than others, and I think by estimating the average flow of that I am on the safe side. I don't believe it would hardly average that, but I have aimed to be on the safe side
557 in this estimate. That, according to my computation, would leave of the waters of that watershed still unaccounted for 16,995 miners' inches, under a four-inch pressure, of a constant flow for the year. That water, in my opinion, makes its way out of this San Fernando valley by percolation, and through the San Fernando valley and the gap which lies between the Cahuenga hills and the mountains on the north. There is no other exit for those waters to my knowledge, nor so far as I have been able to ascertain, and, so far as I know, the whole volume of water must go between those two ranges of hills. It is difficult to state just what proportion passes through the land proposed to be condemned. It is undoubtedly a large portion. The land probably controls a larger portion than actually passes through it. If I were to approximate the amount that actually passes through it, that actually passes through and under this land, there would be possibly as much as two-thirds of it, but I think the land may by its location, control a little more than that. That is the development of more than that might be made on this land. If the developments are made right close to the boundary lines, it would be possible to increase the

amount of water that would be drawn off by it. When the water comes down to the Cahuenga hills, it is then deflected to the east. That deflection is caused by the dyke formed by the Cahuenga hills, which intercepts the percolation in the southerly direction and stops it. It can't go through those hills, because they are impervious to all appearances: as soon as the lower edge of the percolating stratum comes in contact with the hills, it must deflect and get through the pass that lies to the east. That establishes a number of curved lines in the percolating water, which have various degrees of curvature, depending on the distance through east or west below; but afterwards they are deflected almost in an easterly direction, I think, at the mouth of this
558 pass. I have seen the excavations or cuts that are made on the Pomeroy and Hooker tract, which is sought to be condemned. I observed the manner in which the water comes into them. If you look at those cuts you will first see the small seeping or oozing of the water from the soil, which as it leaves the soil collects into small streams and enters the cut. You also observe the rising of the water from the bottom of the cuts upwards, and if you examine the sides where these percolations occur, you will find that by digging out a little on the sides and looking back, you will find that the water just oozes out of it, and as it leaves the soil and comes out of the slope of the cut, it collects from the sides into the cut. Those streams you find in both cuts. These streams that I speak of that are the accumulations of the water oozing from the sides, I could not tell how many there are in the shortest cut of 600 feet. They are very numerous.

Q. A million?

A. Well, I would hate to guess on that. I don't think I could count them. They are too numerous to count. They are past my capacity to count, that is in the time I would have at my disposal. And the water I see bubbles up from below also, which indicates that the water rises through this formation in coming into the cut. I would say that this rising is caused by the hydraulic pressure which, in my opinion, is caused by the complete saturation of that soil from above, all tending down to the point where the trend of the percolation is intercepted by the Cahuenga hills, which makes the hydraulic pressure greater right at the vortex where the trend of the percolation is intercepted, than it would be up in the broad valley. If the resistance to the movement of the water to the east were less than the resistance required to elevate it so as to come up in these ditches i ould not come out. It would then pass off towards the east. I was present and aided in taking measurements of the water in the
559 cuts on the 15th of February. The water at the lower end of the lower development in the cut was 120.8 inches, under a four-inch pressure. I didn't measure it anywhere else on that day, but I did subsequently. I measured it about 250 feet from the upper end, and there was 25 and about five-tenths inches. I have been present at two other measurements of the water at the lower end of the cut. One of them was on the first of March, 1896, and

showed 124 miners' inches. That was the same day I measured it 250 feet below the upper end. The other measurement was on the 10th of March, 1896, and there was 115.5 miners' inches at the lower end. I didn't measure it at the upper end on the same day. There is, according to those measurements, an increase from about 250 feet from the upper end to the lower end, in round numbers, of a hundred inches. I have been along that cut all the way. The increase takes place by a very gradual accession to the water all the way down. You can't see any difference in any given space, say of fifty feet, as to the manner in which the water is coming into the cut from what it is at any other place of the like scope. The material of the cut is very nearly the same all the way; it is a little finer at the lower end. I made no measurement of the surface of the water in the cut, with the view to ascertaining the difference between it and the surface water in the river at different points. I have seen the wells that were dug and bored upon this land, and there was water in all that I saw. The water in those pipes or wells stands higher in all of them than the surface water of the river, and also higher than the water in the cut. That is the case with the wells bored between the river and the cut. The length of the lower cut is, I believe, 1,500 feet. Of the upper one 600 feet. In the upper cut on the 15th of February, the quantity of water at the lower end of the cut was 76.2 inches, under a four-inch pressure. I measured
560 it that same day half way up the cut and there was 32.6 inches under a four-inch pressure. I didn't measure it any nearer the head, but subsequently I did. On the first of March, 170 feet below the upper end. There were 17.7 inches under a four-inch pressure. I didn't measure it right at the head. There was not water enough there to measure hardly. The material in that cut is about the same as the lower one. The increase of the water takes place by gradual seepage into the cut from the sides, and by water rising in small bubbles from the bottom, and that extends all along the cut and on both sides of the cut. The water in the wells that were bored near the head of the cut and adjacent, stands above the water in the river and in the Tejunga stream, and in the cut. There were wells between the river and the cut, and also between the Tejunga stream and the cut, and the water in those wells stands higher than the water in either of the streams. In a general way I am acquainted with the proposed works of the city of Los Angeles for the development of water in that tract. That system. They consist of a main tunnel run up through the tract lengthwise, and of four lateral galleries. The length of the main tunnel is about 8,700 feet. The maximum depth below the saturated plane about 32 feet. The minimum depth a couple of feet, I think. Two or three; and as it extends up it increases to 32 feet. The water plane on each side of that tunnel, at the upper end where it is 32 feet below the surface of the saturated plane, would be affected about 750 feet on each side of it. I arrived at that by an inspection of the experiments made there by the other cuts. Those experiments were observations of the saturated plane in the wells, before the cuts were made, and also after they

were made up to the present time. Many of those wells were bored before the cuts were made. Those which I based my experiments on were all bored before the cuts were
561 made. The last time I observed those cuts was on March 10th. There was no difference at that time, as far as I could see between the levels indicated by the wells then and after I first saw them after the excavations were made. We had measurements taken which showed that the water had risen slightly in the last week in them. But that was shortly after the last rain. At the lower end, the tunnel only drops below the surface about two feet. That would probably affect the water plane not to exceed forty feet on each side—30 or 40. The average distance on each side of the cut or tunnel that the water would be affected would be 395 feet. The tunnel, as projected by the city, is laid out on a uniform grade, and that grade from what I have seen marked on their profile, is one in a thousand. From my observation there are some places where local conditions may affect the surface of the water plane different from other places. There are the conditions which I have observed, having a slight influence on them. One is that at the lower cut the city supply ditch alters the plane of saturation somewhat by percolation from the ditch. At other points I observed that where the material is slightly more compact than at other places the effect of the backward pressure is a little more than where the material is more porous and loose. The proximity of the city ditch seems to cause the saturated plane to raise toward that ditch, after you get back west from the cut, very rapidly. That seems to limit the extent or distance on that side which the water plane is affected by the cut, to some extent. But it does not have any effect on any other of it, as far as limiting it is concerned. To all practical purposes, the results would be about the same if the ditch were not there. The water has been nearly all turned out of the ditch at times since we have been making these investigations. It was turned out of it when I made the last measurement, and I under-
562 stand it had been for some days, nearly all of it turned out.

At the time I made the observation it was nearly all turned out of the ditch. At the head of the ditch there was about 49.2 inches passing the headgate. I didn't make an examination of the plane of saturation to determine whether there was any difference when the water was out of the ditch or not. I made measurements in the water in the excavations at that time at the outlet of the lower development, and I found it 115.5 inches, under a four-inch pressure. I measured the water passing the ditch at the head of this cut, and there was 22.7 passing in the city ditch just west of the cut. I measured it again on March first. That was some time before this. Then there was a very large head running in the ditch. I made no other measurements in the excavation when the water was turned out of the city ditch, except the one at the mouth. I know about where the laterals are located, or filtration galleries as they call them, in this proposed plan of development by the city. There are four of them on the plant that I saw. Lateral number one is 2,100 feet in length; number two, 1,380; number three, 900.

The fourth one I didn't take. In making my estimate of the development there, I changed the condition somewhat of that fourth one from what the city had it. In my opinion the amount of water that could be developed in that tract of land upon the plan proposed by the city, properly executed, and without diminishing the flow of the Los Angeles river, is about 3,000 inches under a four-inch pressure. It figures out nearly 3,170, but I call it 3,000 in round numbers. I have altered the plan in a few particulars so as to prevent it from drawing any water from the river, and by making these alterations I find that amount can be developed without affecting the flow of the Los Angeles river. According to the city's plan they are so constructed that they will, if carried out, draw water from the
563 surface flow of the river. There are points where the galleries approach the stream too near, and there is a point where one gallery runs very close to the Tejunga stream, and they approach very near to the bed of the river at some points. They should be laid far enough from the river so that the development will substantially leave the plane of saturation as it was before it was made. Following that plan, there would be no great difficulty in making the development to the extent of 3,000 inches, and the cost of the plan would not be materially increased from the cost of the plan of the city. In my opinion it is not at all necessary to draw on the river for the purpose of developing the 3,000 inches of water along the line substantially as proposed by the city. There might be a little more developed in that tract, but I don't think it would pay for the extra work. As a practical business view, the development to that extent would practically exceed the amount of development at a depth at which it would flow out by gravity outlet on the level with the lower end of the tract. The elevation of the river where it intersects the tract on the upper end is 493.2 feet above the sea level, and at the lower end 451 feet above sea level.

At this point, and on the 12th of March, 1896, the court delivered its opinion upon the questions submitted to the court.

Mr. FINKLE then resumed his evidence, and testified: I have estimated the cost to construct proper works in a successful and proper manner for the development of water, according to the plans that I speak of for the development of 3,000 inches, and I have estimated it in this way: I have taken 9,030 feet of tunnel for the main tunnel and laterals at $12 per lineal foot, would amount to $108,360.00. Then 2,930 of open conduits where the excavation is not deep, which I assumed would cost $2.00 per foot, would
564 make $5,860.00. Altogether $114,220.00 as the total cost of the gravity development, and that could be so constructed and substantially along the lines marked out by the city, and develop that amount of water without diminishing the surface flow. It would not diminish the surface flow of the river at all, if constructed in a proper manner to avoid it.

I am acquainted with the value of water for distribution in cities, and for use in agricultural lands, where the lands themselves are valuable in this vicinity. In my opinion the value of the water de-

veloped in this tract of land would be from five to six hundred dollars an inch at the lowest. Am acquainted with the Pirtle development, so called. It is located northwesterly from the land in controversy, and I should think a mile and a half or two miles distant. I have been there and seen the excavations. Don't know just what the depth is. Should think the greatest depth should be over 15 feet. I know how much water there is now there. I measured it on the first of March of this year and found it 422.6 inches. The length of the excavation is, approximately, 3,000 feet. The character of the material in the bottom of the Pirtle development is very similar to what it is in the Pomeroy and Hooker tract. I know approximately the width of the stretch across the valley from the Verdugo mountains to the Cahuenga range, at its narrowest point, and I know also the altitude on the northeastern and southern base of the hills there. Referring to the map, Exhibit G., hereby made a part of this statement, the witness said that at the narrowest point of land the elevation is about 450 feet above sea level, and on the other side at the base of the hills about 600. The figures 500 marked on that elevation is about 4,000 feet on the scale from the 600-foot level. From the levels of 700 feet to the 600, at the narrowest point, is about 1,700 feet. From 600 to 500 feet, 4,000. In all
365 the excavations made there, or in that vicinity by wells bored or by any other tests or experiments or investigations that I have made there, I have not discovered the existence of any stream flowing under the surface of the earth, or water-course anywhere. Have been acquainted with the values of water for the last three or four years. There has been no change since June, 1893, in the value. From these excavations and tests made, I should judge that there is no such thing as a continuous clay stratum underneath the surface of the earth in that land, intercepting the flow of the waters. The clay seems to lie in isolated flakes or chunks.

Cross-examination:

When I say the rainfall is about 24 inches, I mean that would be the average for the whole of this watershed, taking as far back as you can get records. The oldest records are about 1871. I found this average by taking the rainfall for all of those years, adding them together, and dividing them by the number of years. Los Angeles city is one of the points I have taken into consideration. San Fernando and Newhall are others. The average rainfall at San Fernando is 15.43 inches. I got that from Government Weather Bureau in this city, as far as I could. The records which they gave me cover 1887 and 1889 inclusive. And upon that I figured the San Fernando rainfall; not wholly upon that basis. I have taken other places on either side into consideration. The rainfall for 1889 and 1890 in that valley was great; but just what time of the year it occurred I could not state now, because it might have occurred after the beginning of January 1st, 1890. I don't know that there were 20 inches of rainfall in the month of December, 1889, in the San Fernando valley. 1887 was a pretty dry year. I

didn't pick out the years; I simply took what there was in the record. The rainfall in Los Angeles for the three years would
566 be somewhat over 49 inches. I don't know how much fell in any one year. I have the rainfall at Newhall, which is not far from this place. The record gives it from 1876 to 1890. I got those figures from the same place, the Weather Bureau in this city. The average at Newhall was 17.23 inches. I have the city of Los Angeles. I have not got the rainfall with me at the city of Los Angeles for the three years, 1887, 1888 and 1889. I just took the average down and the average at Los Angeles. I figured from the year 1876 to the present time. I could not find any records in the San Fernando valley for any other points anywhere on this side of the mountain range. I didn't look for other records, because I didn't know where there were any authentic, except there, I didn't know whether the record in the San Fernando valley was kept by any officer appointed. They were obtained from the archives of the Weather Bureau here. I didn't inquire how many were kept. Don't know anything about the rain gauge they had. The average rainfall in the city of Los Angeles during the years which I have taken it, is 17.65 inches, I think. It is over 17 inches. The average rainfall in San Fernando seems to be about one inch less than it is in Los Angeles. I could not state what has been the minimum rainfall here or in San Bernardino. I don't think it has been as low as six inches for several years, in the last fifteen years. The year of 1893–'94 was the lowest we had, but I don't remember the fall that year. This year, I think it has been between five and six inches. My recollection is that in 1893 and 1894 at San Bernardino it was between seven and eight inches, but I am not sure. I don't remember what it was in 1894 and 1895. I can't say whether it was less than ten inches or slightly more. I don't think it was very far from ten inches. I think, though, it exceeded ten inches some, at San Bernardino. The average of 17 inches in the city of Los Angeles is made up in this way: There
567 are, of course, some extreme years where the rainfall is very high, and other years which are very light, and then there are others which we call mean years for rainfall, and, of course, these extremes generally come out pretty near what the mean is; what the low years are the mean years are. It is taken by averaging all the rainfall. I don't remember the rainfall in the year of 1883 and 1884. I wasn't here that year. I remember the heavy storms in 1889 and 1890. I don't remember the total. I know there was one or two years that were pretty high rainfall in the whole range, but just how high that is I could not state. I could not state whether it would reach 40 inches or not. If I had known that a tabulated statement, showing exactly what each year's rainfall had been, I could have brought it. I saw such a statement there, and could have obtained it. If I had found that — the year 1883 and 1884 there was 38 inches and a fraction of rainfall, and in 1885 32 inches and a fraction, and in 1889, 34 inches and a fraction, and in 1892, 26 inches and a fraction; those years would be four, and the number of years of the record is about

twenty, or over. Those four would increase the average in that ratio only so that it would not have such a marked effect on the increase. In designing a water supply for a city for domestic uses, principally, use of the parks and so on, I would consider that supply with reference to all the possibilities of dry years, taking the country into consideration, and the experience of past years. Practically in some kinds of water supply, for instance in storage reservoirs, I would consider that very closely, and I would try to follow in constructing the system as nearly as possible, the guide which is laid down by observation. If there were three years in succession in which the rainfall was nine inches and a fraction, six inches and a fraction and eleven inches and a fraction, and these years were to follow each other consecutively, I think
568 it would tend to diminish the surface flow of the Los Angeles river somewhat. At the upper end of the valley, I think it would lower the water plane. I could not say how much. I know about what would be discharged constantly, and I think a man could make some kind of a calculation that would arrive at some approximate result; but it would take some time to make that calculation. If I were designing the water system, I would take all those statistics into consideration, supposing that they were statistics. As a general principle governing the fall of water in southern California, the largest rainfall is on the greatest altitude. That is not always so. Suppose in the year 1887 there was 17.95 inches of rain; in the year 1888, 19.25, and in 1889, 34.20 in the city of Los Angeles, the average of these three years would be 22.47; practically 22 and a half. If the rainfall for those three years in the city of Los Angeles was 22½ inches, on the average, and for the same years, it was 16.47 inches in the San Fernando valley, that would show that the rainfall at San Fernando is less than it is in the city of Los Angeles, but it might not show that that would hold good for a greater number of years. I always thought that the rainfall in the San Fernando valley might be a little less than it would be in the city of Los Angeles. The town of San Fernando is at a greater elevation than Los Angeles city. According to this map the elevation at the town of San Fernando is 1,065 feet; at Los Angeles about 255 feet. It is a fact that during the years of great waterfall the increase is frequently due to severe storms which come up suddenly and during which a great amount of water falls in a short time. I would say that in this watershed the greatest fall has frequently taken place within from 24 hours to 72 hours; that half the water for the whole season has fallen. That seems to be rather an extreme case, and I wouldn't want to pass on it without
569 having something to back me up. I have known cases of storms in the mountains near San Bernardino in which ten inches of rain have fallen during one storm. I am not well enough posted on the conditions here, to be able to say that that kind of a case has occurred here. Of course, that rainfall goes to make up the general average for all the years, and the water which falls in such a storm a very great portion of it, is lost by surface flow and run-off. Some watersheds there is quite a portion of it lost. I was

in Los Angeles once during a very heavy storm. Don't remember whether it was in 1889–'90 or 1890–'91. I saw this river at one time when it was pretty high. I forget what year that was now. Some of the levees were built then, but I don't think they were completed. During the storm which raises the water very high, quite a percentage of the water would be discharged and lost; in a year in which the rainfall is small and not violent a greater percentage is saved. It nearly all sinks into the soil then. If five or ten inches of rain should fall in two or three days, the amount of run-off would depend greatly upon whether it was two or three days. Supposing it to be three days, and seven inches should fall in the storm, I should think that possibly forty per cent. of it might run off at that time in the flood. In my estimation of the average rainfall, I didn't separate the evaporation and the run-off. I call them together 53½ per cent. I suppose the total run-off might be somewhere from 15 to 20 per cent. I arrived at the fraction by experiments, and it came out that way, and I didn't take the trouble to drop it. I made comparisons with watersheds that are reported in books and things of that kind, some that I know about personally, and they are very numerous and I could not state them now. I figured it out not exactly by tables, but by reports. I have used the reports of the United States Geological Survey and some private reports
570 and different things of that kind, and some things that came under my own observation. I think I consulted nearly all the text books there are in English, and some in other languages, as authority upon this subject. I consulted some of the works by Jackson, reports of the State geological surveys, such works as Fanning's and other text books on hydraulics. Am acquainted with the Holcomb valley in San Bernardino county. Have been up in Bear valley a number of times. I don't know what the elevation of Holcomb valley is, but I believe somewhere between six and seven thousand feet. It is higher than Bear valley, but I don't think very much. I should not think as much as 1,200 or 1,500 feet. Bear valley is 6,400 feet above sea level, and Holcomb valley is not far from that either way. I have never seen any statistics in Holcomb valley, but I should think as a general matter of principle the rainfall there would be much less than in Bear valley. I know the rainfall at Bear valley is pretty high, but I don't know the average now. The average at San Bernardino is 17.16. Its altitude is 1,050 feet. The rainfall is a little higher in Los Angeles than it is in San Bernardino.

Have examined the Pirtle development on there. I said that in this country in all my examination I have never seen an underground stream. I call an underground stream a stream of water which flows in a well-defined channel. It means a continuous moving stream of water, which moves in a bed having bottom and banks. It would certainly have to have a bed and bottom that you could observe. I don't know as the size of the stream would cut much figure, if it was a stream that you could conceive of having a wet perimeter; that is, would be in contact with some solid substance, around its body, around a body of the stream.

It would be a water-course. In examining the Pirtle development I could see water coming into it along the
571 sides, but I never dug back very far. I didn't go very near to the head of the ditch. I just walked along the bank of it there, one day. I didn't see any place where the water trickled out in a clear stream as large as a lead pencil. I have seen several streams collect and form larger streams than that, even, after they came together outside of the ground. After a large number would flow into one stream, why it would run down the cut and make quite a stream, but that would be on top of the ground; it would not be under ground any more.

Q. Several streams collected and made one large one, and then flowed into the cut, and that is the only thing you have seen of that kind?

A. Well, I don't know as you call them streams. A seepage or oozing out of the ground that would collect on the surface. They were not streams in the sense of streams. When I say that water developed like that is worth $500 an inch; I mean, of course, supposing you can use the water. If you could not get it out, it wouldn't be worth anything. I am not estimating that at $500 an inch it would require a good ready market. I would not call that such an extra good market in southern California where water is scarce and valuable. I think $500 an inch is cheap in southern California. I think it would be worth $500 an inch for irrigation on any land below this point, where it could be taken to.

Q. Well, where is that land?

A. Why, on both sides of the river, there is lots of land that could be irrigated here that needs the water. You may take from Los Angeles to Santa Monica, down along the Cahuenga mountains, on the southerly slope. There is also land on the east side of the river that needs water. I know that this water could be taken very close to the southerly slope of the Cahuenga mountains. I don't know just the extent of the land there that requires water,
572 but there are thousands of acres. There is no water supply there, except small streams, that don't *don't* amount to much. Each individual has his little stream here and there. I don't know whether this Pirtle development has contracted for or arranged for the irrigation of that land down through there. I don't know what they have arranged for. The value of this water would depend on whether there was some place to use it where competition didn't drive the price down too low. I should not consider it valuable for use in the city of Los Angeles, if the city of Los Angeles was already supplied beforehand with all the water they needed here. It might not do to come in here and compete with the present water supply if they have all the water they need.

Redirect examination:

I testified on cross-examination that seven inches of water precipitated in three days, I thought about 40 per cent. of it would run off. That would depend a good deal upon the conditions that happened to exist at the time it commenced to fall. It would depend also a

good deal in the manner in which it fell. That is whether it was evenly distributed over the three days or nine-tenths of it precipitated in two or three hours. It would depend a good deal on the space of time within which it fell. In the years of greatest rainfall, particularly where there are tremendous floods, the percentage of flow-off is greater than it is where the rainfall is about an average; the percolating water does not diminish nearly as much as the run-off does with the difference in conditions. In my vocabulary the term "brook," "rivulet" or "water-course" has no different meaning when applied to the amount of waters under the earth than it does where they are on the surface.

573 Q. Anybody who knows a water-course when he sees it on the surface knows what you mean by one when he sees it under ground?

The question was objected to by the counsel for the plaintiff, upon the grounds that it was leading, uncertain, suggestive, incompetent and immaterial. The court sustained the objection and the defendants excepted.

I know that in all the wells bored on this tract of land is a well about two hundred and thirty feet in depth. And my recollection is that water was found to a depth of a hundred and twenty-three feet. The water stands in that well at least three feet higher than the surface of the water in the river at that point. I don't think the water would stand in the well if the resisting forces of the bottom of it were not greater than the power that it takes to lift the water to that height.

Q. Is the movement of water through the soil against the resistance capable of raising it to that height included within your definition of a water-course?

A. No, sir. Water in a water-course has no such resistance as that.

By the COURT:

Q. A body of water moving through a bed of sand, in your estimation is never a water-course?

A. No, sir. Moving in the voids of the sand. If it move on a bed, on top of a bed of sand——

Q. Oh, I say moving in sand.

A. Moving within the sand, I say it is never a water-course.

Q. Moving in a bed of boulders, would you call it a water-course?

A. Not unless there was well-defined openings among the boulders.

Q. Well, suppose the boulders were so large you could see the water running down underneath?

A. If you could see well-defined channels running through between the boulders, I would think then it would be a water-course.

Q. Unless you could see it, it wouldn't be a water-course?

574 A. Unless you could see it and determine it. Determine it either by seeing it or some other way equally certain.

Q. To what point of fineness would you say that the moving water would cease to be a water-course and become percolating water?

A. Well, I don't believe, in my opinion, as near as I have been able to study technical terms of all the hydraulic engineers that the matter is defined by the size of the voids. I define it—draw the line when the water moves simply through the apertures in sinuous motions conforming to the lay of the voids or material; or when it moves between apertures which are direct, and the filaments of the water can move in direct lines or slightly curved lines, through the material.

Q. I presume the question of what is percolating and what is a stream is to some extent a question of law.

A. Yes, sir; I only speak of it from my standpoint.

Q. I was only trying to get at your idea, that is all.

A. Yes, sir. And I don't claim to know the law.

The witness continuing his testimony in answer to question of the counsel for the defendants said: I know what the borings in the wells in that country show.

Q. Is there any single one of them that presents any such phenomenon as simply boulders through which the water is pouring, or is there sand in the crevices of the boulders and other materials, all the way through and everywhere.

A. From the wells we bored the material brought up showed that the voids—in the larger voids—were well filled with gravel, and the voids in this gravel, again, well filled with sand; that there were no large openings between the boulders. No such thing as cavities in which there was nothing but flowing water. I saw no such thing in any of those wells.

575 Recross-examination:

If I had a canal with sides and bottom, which was practically impervious, and the water running through it, that would be a stream or water-course.

Q. If you were to dump into that canal several loads of cobblestones, and the water ran through the stones, it would then be percolating water, in your opinion, would it?

A. Well, if you would fill the canal with material that would consume the greater part of the cross-section of it, and allow the water only to filter through it, I would say that would be no longer a water-course.

Q. Answer my question. If you would fill it up with cobblestones so that 40 per cent., we will say, only was void—of the contents were voids, and the water should run through them and through that 40 per cent., it would cease then, in your opinion, to be a water-course, and would become a body of percolating water.

A. Well, in a case like that, which is an extreme, because where you put in cobblestones, exactly 40 per cent. of voids and clean cobblestones, with a well-defined, impervious perimeter all around, it might be hard to say that that would be percolating water. In fact, I would say that would be an obstructed water-course; artificially obstructed water-course is what I would really call that. I don't testify that the percentage of voids through the strata of

boulders and gravel which was encountered here on this land is about 40 per cent. I testified that they were about one-third. That I estimated that the soil as I found it in these excavations, contained one-third voids. That a cubic foot of that soil was one-third water and two-thirds gravel or sand or soil, as it might be.

Q. Isn't it a fact that the voids in the coarse gravel in the lower strata—that is designated as boulders and coarse gravel in that deep well—isn't it a fact that the voids, boulders and gravel, the percentage of voids is much greater than it is in the average of the
576 land?

A. No, sir; it is less. In the lower strata as we saw them from those wells, where there is large boulders, small boulders and sand, all mixed, the voids would certainly be much less than they would be in more uniform material, of more uniform size.

Q. But if the percentage of voids in all that territory is thirty-three and one-third per cent. there are certain places in there where the percentage of voids are as high as 40 per cent., aren't they?

A. Well, I doubt whether they would be quite that high. I don't know of any stratum of material where the voids were equal to 40 per cent. The voids on an average are about one-third as appears from our experiments.

Q. Well, I will ask you of you should take a clean-cut running stream, with rock sides and bank and bottom, and should dump into that a material of gravel, rocks, boulders and sand, in which one-third was voids and the water had to go through that to escape it would cease to be a stream.

A. A. Yes, sir, it would have to percolate through that material to get through.

Q. Then that, then is your definition of a water-course. You have, in your testimony, embodied your own ideas of what a water-course is and what percolating water is?

A. Well, I have stated exactly what I conceive to be percolating water. I think quite as plainly as I can.

Redirect examination:

In those borings there was no such thing found as a place with rock sides and solid, where the water is percolating between those sides. Nor a canal that had been cemented up on the sides.

Q. Now then, what is the width of that stream as testified by those borings if it exists.

A. Well, borings as far as they have been made seem to
577 show that for a mile or two across that opening at the head of the valley that the same condition exists. In the very strata that were encountered in boring wells at those different points the strata were all quite similar. I have been over a good deal of southern California, and have been here for nine years, practicing my profession in southern California. I have been in a few other places.

Q. Did you ever find a stream in any country that you would call a water-course, the waters of which moved at the rate of fourteen or seventeen miles per annum.

The counsel for the plaintiff objected to the question upon the ground that it was immaterial, irrelevant and incompetent, and the court sustained the objection and the defendants excepted.

Recross-examination:

I stated that approximately of the percolating waters from the watershed that from the location of this land I though- that somewhere near two-thirds would pass through or under it. It is not equally distributed across that cross-section, across the valley, as you can readily see by the slope of the opening. I think much more runs under the land where this land is than flows up under the hill. I think that the velocity is greater.

Question by the counsel for the defendants: What is the width as shown by those borings of this stream across this land?

A. About two thousand feet, I think, at one point where we explored it.

JAMES T. TAYLOR was called as a witness on behalf of the defendants, and, being duly sworn, testified as follows: Am a civil engineer. Reside at Pomona, and have resided in southern California since about April, 1883. Have been practicing my profession about fourteen or fifteen years and made a study of hydraulic engineering,
and have been engaged in the practice of that department of the
578 profession in Los Angeles, San Bernardino and Riverside counties principally, and ever since I have been living here. I have had experience in the development of water in this section of the country by means of tunnel. In Pomona, San Antonio cañon, Cucamonga cañon. Am pretty well acquainted with the streams in this section of the country in a general way. There is great similarity of the waters in the streams in southern California in some localities. Works constructed by me in San Antonio cañon were two tunnels put in for the development of water. Probably eight or nine thousand feet in length. Have been on the tract of land sought to be condemned. Employed by Hooker and Pomeroy to make the investigation, and am acquainted with the cuts made on the land and the wells that were bored. First went up there in the early part of February; then later on February 15th. Since that time have been almost exclusively engaged in making examinations of that property. Been all along both of the excavations. Measured the water in them. In the lower cut I think we measured the water on the 16th of February. At the lower end where it empties into the river and found about 121 inches. Measured it in other places on that day, but on March 1st measured it about 200 feet from the upper end of the lower cut. Found about twenty-one and one-half inches. Measured no other point on that day. Observed the water at the lower end, and there was no apparent decrease in the quantity flowing there from what there had been from the time that we measured it on the 16th of February. Right at the head of this cut there is very little water flowing. There is about a quarter of an inch. Difficult to measure it by ordinary methods. From my examinations and walking along both sides of the cut, it would seem

to me that the water came in very gradually and uniformly over the entire length of the cut. It came from the sides of the
579 slopes made by the cut, and along the bottom in places. I could not see any difference by examination with the eye as to the quantity that came from one side of the cut as compared with the other. The lower end of the cut empties into the river and at the upper end it is between three and four hundred feet distant from the river. There are wells bored between the cut and the river, and water standing in the wells, which seems to stand several feet higher than it does in the cut or the river. Some of the wells were there when I went there the first time. Have been there ever since the first of March. The last time I observed the wells to see whether the water was standing there, was on the 17th of February, I think. I examined some of them when I first saw them in the fore part of February. In those that I examined the water was standing in them then. Since I first examined them up to this time I have not observed at any time any diminution or fall in the level of the water in those wells except the one where the hole was cut in the pipe. The material found in the excavation is principally sand, a little soil on top and fine sand and coarser sand down to the bottom and in places a little gravel. I didn't see any boulders along there. Have seen the upper cut. Material there about the same. The water comes in about the same; very uniformly over the entire length of the cut. There is an increase in the amount of water from the head of the cut to the mouth of it. On February 16th, I measured it at the mouth. There were about 76 inches. The 17th was the last day that I was there. From the first time I saw it to the last, there has not been, to my knowledge, any diminution in the quantity so far as I could observe. Would be a very little water at the head of the cut, I would say not more than a fraction of a miners' inch. The increase there is gradual and uniform over the surface exposed by the cut.
If there were a marked difference at those places it
580 would be easily discernible, I think. I didn't discover in any of those wells or in the cut any water-course or stream of water flowing in any defined channel. I never discovered at any point the water flowing in any considerable body at any place outside of the river and the trenches. In my opinion, the sources of supply, both of this underground water and the Los Angeles river is derived from the rainfall on the drainage area of the San Fernando Valley basin. I know something of the rainfall within this watershed; at Tropico for a short time and the rainfall at San Fernando. The record at Tropico is only for a short period, from 1888 to 1890, and the average is given as 21.22 inches. At San Fernando it covers a period from 1877 to 1889, and the average is 16.43 inches, at the town of San Fernando. Those are the only points in the San Fernando valley that I have the record of with me. The average rainfall in Los Angeles city form 1878 to 1895 is 17.56 inches. The average at Pasadena, if I remember, is 23 inches; a little over. From my observation and information there is a general principle regulating the comparative rainfall in lower and higher altitudes.

The rainfall in the mountainous regions or higher altitudes is largely in excess of that in the plain or valleys below. Am acquainted with the amount of rainfall on the same range of mountains along on the south slope of the mountains south of Old Baldy mountain. That is about on the county boundary line between San Bernardino and Los Angeles, and from there on to the Bear Valley range and on south into the range back of San Diego, Coast range. The rainfall on the Old Baldy mountain at an altitude of from four to five thousand feet is about four feet. At Bear valley the average taken at the dam, which is an elevation of 6,400 feet above sea level, is about 56 or 58 inches. Know nothing of Holcomb valley only in a general way as to its location. It is on the north slope of the mountains.

581 Drains out into the Mojave river. I estimate the average rainfall on the whole San Fernando watershed at 24 inches. The watershed is about 485 square miles. About one-third of it is in what would be termed the valley proper; two-thirds being in the mountainous regions, running up to an elevation of four, five or six thousand feet. The character of the mountain sides is rough, broken and rather precipitous. Calculated at an average of 24 inches of water, the rainfall over that area of watershed would amount to 42,680 inches under a four-inch pressure, of constant flow for the year. I estimate the evaporation and that needed for plant life would be 30 per cent. of that, which is about 12,800 inches, and the run-off about 25 per cent. or 10,670, making altogether 23,470 odd inches. In the flow-off I include the ordinary flow of the Los Angeles river, as well as the flood run-off. I include all the water that flows off on the surface. The waters flowing from the mountainous portions through the San Fernando valley take a general southwesterly direction until they enter the valley, then a southerly course, and a little southeasterly, as they approach the eastern end of the Cahuenga range of hills. They then flow easterly around through the gap of the Cahuenga hills and the hills on the opposite side. From my investigation, I don't think there is any other outlet than through that gap, between the Cahuenga and Verdugo ranges. The deflection to the east, after the waters have reached the northern pass of the Cahuenga hills, in my opinion, is due to the obstruction that those hills make, which might be called a dyke which forces the water to the surface, and makes it necessary for it to flow easterly on a lower grade. It forces it to the surface because the movement of the water is obstructed by the impervious strata in the dyke and the resistence it meets there is so great that it forces it through the surface, rather than off through the underground ma-

582 terial. It meets with less resistance in raising towards the surface for some distance, than it does in coming this way to the east through the material. There is considerable difference in the grade to the northward to the Cahuenga range, and eastward through the plain. The greater grade is through the San Fernando valley south toward the hills. In my opinion, of the water that passes through the soil underneath the surface through this gap, from 55 to 60 per cent of it comes through this tract of land sought to be condemned. Have examined the proposed works of the city of Los

Angeles for the purpose of developing water upon that land, to some extent. Know about where they propose to construct the tunnel, and practically the location and length of the so-called filtration galleries. From my investigations, I think there could be developed in substantially the same place that the city proposes to make this development, about three thousand inches of water by works properly constructed, and in substantially the same locality, and without diminishing the natural flow of the Los Angeles river. The cost of constructing the works in a proper manner, I estimate from $100,000 to $120,000 *dollars*. Am acquainted with value of water in this section, and have been for the last three or four years. I know what is the altitude of this tract of land, and approximately the elevation above the city of Los Angeles. Am acquainted in a general way with the country to the west and east of the city, and have been over some portions of it. In June 1893, in my opinion, the value of water per inch, measured under a four-inch pressure, was from $500 to $600 an inch. I know the depth of some of the wells sunk in that vicinity. There was a great number of shallow wells which were sunk to show the saturated plane. I could not give the exact depth. I know the deeper wells. I believe there is one something over 200 feet, in which water was found to a depth of
583 125 feet or 126 feet. I have been to that well. The water stands in it at a height of several feet above the water in the surface of the river. The causes of the water standing in the well at that height is, I think, the pressure from below. The upward pressure. If the resistance below were less than the amount of pressure required to retain the water at that height, it would not stay there. I haven't in any of those excavations, or wells, or by any other means, discovered any evidence of the existence of any underground water-course, at any point. At the time we made the measurements in these excavations there was running in the ditch used by the city of Los Angeles, connecting with the river on the tract of land. And at the time all of those measurements were made. I measured the quantity of water on the ditch on the 16th of February, and there was about 473 inches. I measured it again on the first of March in the ditch at a point above the lower cut, and found 930 inches. I think we found by measurement a slight increase in the flow in the cut on this measurement. There had been no rains between the 15th of February and the first of March. Measured the water in the ditch at more than one point. Found at the head of the ditch on the 15th of February 473 inches. The other measurement was made at a different date, and there was more water turned in and the measurement was 930 inches. Made a measurement at weir No. 3, and found 422 inches. Made measurements of the water in the Los Angeles river on March 3rd., 1896. At the lower weir by weir measurement; also at a point about 200 feet above in the stream by taking the velocity and the cross-section of the stream, and I found at that point by the measurement on the river 3,840 inches; at the weir 3,851 inches; at the time that this measurement was made the water which usually flows in

the city ditch was turned into the Los Angeles river at a
584 point above where the measurements were taken. It was running at that time. The measurement was made about one o'clock, and I think had been running more or less since the day before. Mr. Friel was with me. We measured it lower near the northern boundary of the city of Los Angeles, and found 7,087 inches flowing there on the same day, between 4 and 5 o'clock in the afternoon. It had been running all day, more or less. I never made any measurement of the water in the River Los Angeles before the rains, near the city boundary. About the same time, the same day, and a little after five o'clock, we measured the water flowing in an irrigating ditch which was diverted at a point above where we made the lower measurement, and found about 143 inches in that irrigating ditch. I think a development could be constructed to a depth of ten or twelve feet below the river, without materially affecting the flow of the river. The proposed tunnel, I think, crosses the river bed three times. The first crossing is about 20 feet below the surface; the second about 24 or 25 and the third about 30 or 31. At that depth, in my opinion, it would not draw materially from the surface flow.

Cross-examination:

Have been up into the San Fernando valley about five different times. Prior to that have passed through the valley several times on the railroad. Made no investigations on these trips. Never made any other investigations in the valley prior to the commencement of this suit, only in a general way. I have known some of the conditions of the Tejunga watershed from surveys and maps made by Mr. Friel, which I examined several years ago. Simply looking into it as a matter of interest to myself. Those maps and profiles were
made by Mr. Friel who, at that time, made an accurate sur-
585 vey of the watershed of the Tejunga for the purpose of determining the possibility or feasibility of storing water. I don't remember who for. I don't know what work was constructed, if any. I don't know that they built a dam. Remember reading a description of a submerged dam somewhere in that locality, but I don't know as it refers to this particular matter. I have looked into the matter of the rainfall of that watershed somewhat, and made a pretty careful study of it since I have been examining into the conditions as they exist. The means employed has been by taking the rainfall in other localities where it is known and has been observed. The rainfall at Los Angeles since 1878 to '95, 17.68 inches, given by the Weather Bureau. The rainfall given at Pasadena, which is a little over 22 inches. I considered that as information which might bear upon the subject. The rainfall at Pomona and the base of the hills at that point, and also further up in the mountains, and further to the east, and extending into Bear valley and on the watershed in Riverside county, and on the north slope of what is known as Smith mountain, and on the watershed still further south towards San Diego. Those are places w-ere I know approximately what the rainfall is, and from that and other data and general information on the

subject, and as to the increased rainfall at the higher altitudes upon carefully studying the area in the watershed, I arrived at the conclusion that a fair average for this watershed, under the existing conditions, so far as I know them, would be about 24 inches.

A tunnel constructed under the conditions that exist on this tract and the position where the depth of 32 feet below the water plane would be located, I should say would affect the water plane possibly four hundred feet on each side; maybe a little more. If the soil was similar on each side, and in this tract it is similar in
586 a general way—if the tunnel was constructed within a distance of 200 feet from the river, it might have a little effect upon the surface flow, if the tunnel was not protected. If the tunnel was constructed at a depth of from 20 to 32 feet beneath the water plane and parallel to the river and 200 feet from it, I don't think it would have any material effect on the surface flow. The "water plane" means the plane at which the water runs at an inclination. If the river was flowing at the distance of 200 feet from the tunnel, the ground directly under the river would not be dry. If the curve of the river plane ran back 400 feet from the tunnel and the river was running over the top of the ground here at 200 feet from the tunnel, the ground under the river would not be dry, because on that land there is a continuous upward pressure of the water which is forced to the surface by reason of the dyke or range of the Cahuenga hills, which keeps forcing the water up from the bottom and furnishes that supply. The water is continually forced upward there and when it comes to where that cut is, it would be drained off.

Q. And the water, as I have said before two or three times, between the two curves in the water plane which are created by this tunnel, the land between those two curves will be absolutely deprived of water, will it not?

A. Well.

Q. It must be, mustn't it?

A. Well, water would be flowing through there and finding its way into the tunnel or cut. Not necessarily from the top. I said that in my opinion, when the tunnel is built, it would affect the water plane back to the extent of four hundred feet. That it will draw the water from it to that distance, and when it draws the water from that land above it and for 400 feet back each way, something will occur to fill the voids that that creates.

Q. Won't the voids created by that draft on the water
587 plane, at that point, be filled by surface flow, providing it is a pervious or water-bearing soil between the river and those voids?

A. Well, the water is slowly percolating or seeping through that soil and as it is drained off, of course the water keeps moving and then the river is also supplied in addition to the water moving in a southerly and easterly direction through a portion of that tract the water is also coming up from below. Then, to fill the voids above the tunnel, it is coming up from below to some extent. It would not come through the tunnel. In order to avoid the affecting of the river, when the tunnel was underneath it, of course the tunnel

would have to be made tight. Then the effect would be that the water would simply go around this pipe. It would be simply an obstruction. I can't say that I have ever seen any underground streams. Am familiar with the Mojave river only in a general way. Never had any engineering over there. In the Lytle creek to some extent. The waters of that stream flow on the surface, and then disappear, and there are places where the water rises. I have been all along Lytle creek, and have seen where the water disappears, and have seen water appear again at a point lower down. I could not state it was the same water. I know, as a matter of fact, that streams in this western country are created in this character of soil, sink into the surface, and rise again at points lower down at some times. If such a stream is flowing on the surface I call it a water-course. If I saw it again a mile below on the surface, I would call it a water-course where the water was flowing.

Q. But if that stream was flowing under the surface between those two points, at that point you wouldn't call it a water-course?

A. Well, that would depend largely on how it was flowing. My idea of water running in a defined channel is that it must be running in a body and confined by bottom and sides, so that it could be determined.

Q. If the same water was under the surface at one point,
588 and the same water came to the surface at another point, and between the two points they ran under ground, what conditions would you want to have exist there to make it a water-course, in your opinion?

A. If it was flowing as it naturally flows on the surface of the ground and could be determined by measurements as to its depth and width, why, it might be classed as an underground channel or stream.

Q. Well, you people have been able, have you not, including yourself, to determine very accurately the width and depth and so on, and amount, even to fractions of an inch, of the water flowing down through this territory.

A. I haven't testified that I have. I have testified as to the amount which we think could be developed, and as to the amount of water that is flowing under the ground between these two ranges of hills. I have determined the distances of the rock ranges of hills on each side, and the strata underground, as far as I know what it is, is determined by the wells which have been bored and I have determined it in my mind from those localities. If the Los Angeles river should be found flowing upon the surface at one point upon Exhibit F, marked Lateral No. 4, and should sink there and reappear again at the point marked Lateral No. 2, it would depend upon the conditions whether I would determine that between those two points it was percolating water, and at those two points was a water-course, and those conditions do not exist on this land. The river does not sink at that point. From my knowledge of the material underneath, if the river should sink at one of those points and reappear at the other, the flow of the water I should certainly call percolating water. And if the water was

gathered again and ran in a well-defined channel on the surface that could be measured, I would call it a stream. The water flowing under the ground in a general way be
589 measured. I have made figures upon it and determined it approximately in my mind. I believe that the Los Angeles river is fed by this watershed and by these underground waters. I have also determined that as a general thing, excepting in times of rain, there is something like a thousand inches, in round numbers, flowing in the river where it enters the Pomeroy and Hooker tract, and about 2,000 on the surface where it leaves it; that there is a gain in the surface flow on that tract of about one thousand inches. If that 2,000 inches were diverted at the easterly end of the tract, and all taken out, from the measurements I have made, there would be an increase from that point on down in the river channel. I could not state exactly as to what amount it would contain by the time it reached the north boundary of the city, because those measurements were taken during the time of storm, and they would be affected by the storm water. But there would be other water which would come into the river, if it were all diverted at the eastern extremity of the tract sought to be condemned, and that water which reappeared on the surface lower down would be from the underground water; and possibly some of this water which is flowing under ground in this tract might come to the surface lower down and supply that surface flow. I think the increase in the river is very gradual. I measured it at the lands of Pomeroy and Hooker, where there was about 3,000 inches, and again at the north city boundary where there was over 7,000 inches. The city water company in the meantime was taking out in the vicinity of 800 inches at the Crystal springs. We examined the main flume there, and the water was all turned into the river when that measurement was made. I know they were diverting some, but don't know that they were diverting the water which supplied the people of the city at that time. I know that according to my measurements, the
590 water more than doubled between the north boundary of the city and the eastern boundary of the tract sought to be condemned, notwithstanding they were taking out some water; but I don't know for domestic uses of the city, between the points. The water which caused this increase was derived partly from the watershed of the San Fernando basin, and partly from the watershed which would be tributary to that further down. I think it is called the Verdugo watershed. If you were to put such a development in the surface of the river down below the Pomeroy and Hooker tract, as to drain it all the time, the river would be in part supplied by the underground waters that are running under this tract. It furnishes a portion of the supply through this tract.

Q. What furnishes any more of it?

A. The water coming in from the sides. That is also underground water. A part of the same water plane; the same general shed.

In answer to questions by the court, the witness said that they had made measurements at the head of the city ditch on the day that

they had measured the river towards the upper end of this land, and also at the lower end, and there was about 470 odd inches flowing in the ditch at that time. That they were down to the flume at a point where the waste-gate was and where the weir was located. There was a brush dam where the water was diverted into the city ditch. I could not say as to whether it extended clear across the river. There was considerable water flowing immediately below the dam. I think as much as flowed in the ditch, and might have been more; and the same day there was twice as much flowing in the river at the lower end of the ditch as there was at the upper end.

I found that one measurement made of the ditch showed about 900 inches in the weir above the lower cut, and the measurement, at the time it was about 417 inches in the ditch, was 121 inches
591 in the cut, and at the time there was 900 inches in the ditch there was 124 and a fraction in the cut. A difference of about four inches of increase at that time. I attributed the increase possibly to the seepage from the ditch. I think the amount of water put into this ditch would have some effect upon it. I think the water seeped a little from that ditch. I consider that the water that is moving underneath that land is percolating water, as I have not discovered from my investigations any well-defined channel through which the water was flowing.

Q. Taking the conditions as they exist on this land, the materials—the same and the stream flowing through the land where the waters of that stream flow on the surface they are, in your opinion, surface waters, and where the waters flow under the surface they are, in your opinion, percolating; is that correct?

A. Well, the water that is flowing on the surface is separate from the water that is flowing underneath and flowing under different conditions. The water on the surface is flowing probably six hundred times faster than the water that is moving underneath. The water that is naturally flowing in the stream, of course, it is a stream. The water that is simply moving through that soil underneath there, is certainly, in my opinion, percolating water.

Q. Isn't it a fact that the waters that are flowing under are immediately contiguous to and supporting the river all the time?

A. Well, the river is fed to some extent from the underflow.

Q. Answer the question, please, if you can. Isn't it a fact that the underground waters are immediately under the river and supporting the river all the time?

A. The water is, in my opinion, underlying the whole tract of land and extends to some considerable depth. It is a fact that the underground waters that are under this land come up to the
592 river and are in it and supporting it all the time, to some extent.

Q. If the underground waters should leave the river and the underground waters should disappear from under the river, leaving the ground under the river dry, wouldn't the river sink into that ground?

A. Well, the water is continually coming in from the watershed above and furnishing that supply from the north.

Q. I am supposing that it didn't. I am supposing that the water disappeared from under the river bed, and left the ground under that bed dry, with voids and without water.

A. It is pretty hard to give an opinion upon conditions that do not exist, and what might change the entire movement of that water. I think such conditions would have some effect upon the entire movement, if they existed. I think in some places that the water plans extends under the river, and that the underground waters come up to and under the river and support it. I do not think it is so in all places. I think the borings in this cross-section show the depth to which the first water is found; in some cases it is a considerable depth below the river. I don't think that there are places under the river bed which are necessarily dry. There would have to be some water to support the river unless the bed of the river was impervious; and where the soil is not impervious the underground waters much come up and support the flow, to some extent. I know why the rainfall is higher in mountains than in the plains. The effect in the change of the temperature precipitates the water from the clouds. That is the principal cause. I have not been in Holcomb valley, and I have been in Bear valley. I don't know how much higher Holcomb valley is than Bear valley. It is higher, and on the north slope of that range of mountains. I think the rainfall in Holcomb valley is less than it is in Bear valley.
593 There is a reason for that. The clouds as they strike the mountains the rain is precipitated there and most of the rainfall falls on this side of the mountains. The Bear valley is on one side and Holcomb valley is on the other. That is the principal reason for the difference in the rainfall. I should say the direction of the saturated wind currents in this locality is from the southwest. I can't say that I know very much about it in this locality. I think the general storm comes from that direction.

Redirect examination:

From the point where the river enters this land on the westerly side, to where it leaves it on the easterly side, there is an increase of about double the amount of water in the Los Angeles river. That increase is, I think, generally gradual and uniform. The river does not sink at any point on that land that I know of, and I don't think it does. My idea of percolating water is that it is water which is moving slowly through the material. It may be sand, gravel and boulders, more or less compact, having voids from 20 to 25 per cent., where there is great resistance to it, and where it is not running in a body as in a well-defined channel. In my vocabulary it does not make any difference where the water comes from, in determining its character of percolating or a water-course.

By Mr. CHAPMAN:

Q. I suppose that I can assume that, whether water is percolating or flowing in a natural course, it comes from somewhere. And you have testified that in this basin, the whole of it, both flowing streams and the underground flow, comes from the rainfall in the mountains

A. Yes, sir.

Q. When it is descending from the clouds upon the mountain and plain, what do you call it then?

Mr. DUNN: We will stipulate it is rain.

By Mr. CHAPMAN:

594 Q. Then when it descends into the earth and makes its way down, you would not apply the term rain to it any longer, would you?

A. No sir.

The average width of the Los Angeles river through this land is about forty-five feet.

Q. Now, if this water did wholly disappear at one point and you found the waters permeating the soil for a width of a mile or a mile and a half, and over a stretch of water, and you knew that was the Los Angeles river, would that have any effect, in your opinion, upon its character, as to whether it had ceased to be a natural water-course and become percolating?

A. I would consider it percolating water. I measured the velocity of the stream on March 3rd; a little above the lower weir, and found a mean velocity of about 2 feet per second. At the northern boundary of the city I took the velocity and found it to be 2.8 feet per second. Measured the velocity above the upper weir and the velocity was about eight-tenths of a foot per second; but that would not be the average velocity of the river at that point, because the river was backed up by the weir. I should say the average would be at that point, probably, from a foot and a half to a foot and three-quarters per second. Those are the only points where I made measurements of the velocity of the waters in the river. It was March 3rd that I measured the river at the north boundary on that day, and I found at the east boundary of the land in controversy 3,840 inches by one measurement and 3,851 by the other. One was the weir and the other was the stream. It had been raining. Those measurements were made about one o'clock, and it had been raining since the evening before. The measurement that I made at the north boundary of the city was about five o'clock in the afternoon of the same day and the rain had continued up to that time, more or less, during the day.

595 Recross-examination:

I say to have percolating waters, the voids should be from 25 to 30 per cent. or in that vicinity. I don't think there are places in this land where there is as little as 20 per cent. I should think that, in my judgment, as low as it runs is 25 per cent. I testified that in regard to the material where the developments were made, the voids were about 33⅓ per cent. I don't remember that I testified that the voids were 33⅓ per cent. throughout the entire section. If the lowest percentage of voids was 25 per cent. and the average 33, there might be other material to make the percentage 40 per cent.; at other places. I don't think there are strata and material where

those wells were bored, where the voids are as high as forty per cent. I think that the voids would be about 25 per cent. in that class of material. Voids in the fine sand or finer material are greater than they are in coarse material. If the boulders are packed closer together there are no voids in them. The coarser material allows the water to flow most readily through it, unless there is smaller material and more compact between the boulders. That is the way it is composed, both of fine and coarse material, and that is the way that it usually is. As far as my investigations have gone, I think that the percentage of the voids in the material underlying this land will not exceed 25 per cent.

C. W. SAUNDERS was called as a witness for the defendants, and being sworn, testified: I reside in Los Angeles; for five years. Am a civil engineer. Paid attention to hydraulic engineering. Been in that business since 1876 most of the time. Practiced it in different parts of the country, including southern California. Have been here for the past five years, and also in 1886 and '87. Have been on the tract of land sought to be condemned. Have been familiar with it for four years. Been there recently investigating that section of country
596 in the employ of Messrs. Pomeroy and Hooker. Went up there on March 1st of this year. Looked at the development then made, and we measured water at different places through the tract, flowing in the development and in the Los Angeles river. Looked at the wells that they had driven—some of them—and looked the country over generally. Have had occasion to study the subject of the sources of the water supply there, and the movement of the water, for several years. I know the plans proposed by the city of Los Angeles for the development of water on that tract, in a general way. Approximately where their tunnel is located. There would not be any great deal of difference in a short distance one way or the other in the location of their tunnel. I know about the length of the tunnel. Have seen the excavations on this land made under the direction of Pomeroy and Hooker. Examined some of the wells bored there. The shallow wells are the only ones I have seen. Know where the proposed laterals are to be constructed. I looked very carefully at the excavations. Noted the manner in which the water came into them. It comes into those cuts from the sides and from the bottom, apparently in a very regular manner, distributed very regularly along each side, and there are indications of its coming from the bottom in both cuts. There is no perceptible difference in the amount of water coming in on one side of the cut from that on the other. Apparently the same amount is coming in from either side. Very little water at the extreme head of one of the cuts. We measured the water in the longer cut, the lower one, on March 1st, and found about 122 or 123 inches. In round numbers 125. We didn't measure at the lower end of the upper cut on that day. I have never measured the water at the lower end of that upper cut. The increase from the upper end of the upper cut to the lower end is not by any sudden influx at any particular point.
597 It appears to be a gradual increase from the end to the lower point of development. Was present at the measurement of the

quantity of water in the Los Angeles river at the western boundary of the tract and the eastern. The difference between the two was 1,059 inches on that day. The amount at the upper end was 1,065 inches. I noticed the river at several points in its natural course as to the manner in which the water appears in the river. It appears to come in in the same manner as that coming into the cuts, except that there has been more growth of willows, and trees, and rushes, on the bank, and the stream is not as plainly to be observed as the cuts. The growth upon that land is rushes and willows, alders, and on some of the higher land a few live oaks. There are few places where the willows and alders grow quite thick, and of large size. I should say some of the alders were six to eight inches in diameter, and quite a growth on the upper end of the land sought to be condemned, and a thick growth near the lower end. Between these two points there is a smaller growth of willows, and a part of the land is more or less swampy and part of the higher land that might be classed as mesa. Quite dry and open. Very little growth upon the mesa. In my opinion you could surely develop 2,000 inches of water in that tract of land, without diminishing the surface flow on the river, and there is a possibility of developing 4,000 inches, without diminishing the supply of the surface. I have been all along that tract of country once or twice every year for the last four or five years. I had some work to do there. That is the reason I am more or less familiar with it; three or four years ago, and I have been there every year since. I think that works could be constructed so as to develop anywhere from 2,000 to 4,000 inches, in such manner as not to diminish the flow of the stream. I am quite positive it could be done. I should imagine that it would cost about
398 twenty thousand dollars more to make the protections necessary to cut out the Los Angeles River water. That is in addition to a system which would take water from the surface flow, if constructed along the lines proposed by the city. I know how the laterals are located, in a general way. To construct those works to make that development, without affecting the surface flow, it would be necessary to protect them and make them water-tight where it approaches near the river. If it were a thousand feet deep it would not be; but without making them water-tight I don't think it would be safe to go under that river at any appreciable depth at all. It would naturally take the water in its natural vicinity. I think it would be protected for a certain distance on each side of the river if laid within practical limits. The lower plane of that is governed by the lower line of this land, and we couldn't go any lower than would allow us to take the water out at that point. I think about thirty feet at that point. I do not think any development which could be made upon this lower plane would be safe to take under the river without making it water-tight; but in crossing the river bed at the depth indicated where it is proposed to cross it at the depth of thirty feet, it would not have any effect upon the surface flow if it was made water-tight. If it weren't made water-tight it would take some of the water that would otherwise naturally come to the surface flow of the river. Not very much; it is rather hard

to state just how much it would take. I think it would obstruct some but I have not formed any estimate of how much. The points of which in the proposed works the tunnel crosses the river are three in number. To protect the pipe or whatever else you might use and to avoid drawing from the river, it would be necessary to make the conduit water-tight several hundred feet on each side of the river. When we were there on March 1st I observed the
599 city ditch that is used by the city of Los Angeles at that time. We measured the water flowing in that ditch at a point about five hundred feet west of the upper end of the lower development, and found it to be running at that point 935 inches. I didn't measure it at the head of the ditch. I think there is quite a large proportion of the water that comes down the plane from the north until it strikes the Cahuenga range that passes through this particular tract of land. It occupies quite a governing position in regard to that flow of underground water, undoubtedly. I consider it safe to estimate that one-half of the whole of that water passes through this land. I think the clay strata underlie the whole surface of the valley. I think the structure is quite uniform, but in a great many places that clay strata is broken. There is a decided difference in the thickness of it at different points where I have investigated. I know the value of water in this vicinity per inch, measured under a four-inch pressure. Have been acquainted with the values for the past three, or four, or five years. In my opinion the value of an inch of water developed and upon this land in the month of June 1893, would be about $600 an inch. The cost of developing it would be about $125,000.

I know the Pirtle development. Have been at the excavation made there. Had charge of that development work as engineer. Have observed the manner in which the water appears in the excavations made there. It comes in nearly the same as in the excavations upon the land of Pomeroy and Hooker. Practically the same. The material is nearly of the same class. Probably a little coarser. The water was found at that place running upon the surface. A small stream was running upon the surface previous to development or collecting, about 75 inches in that vicinity. That was on September 10th. That was when we commenced the development. That came from a cienega or draw
600 that is there. There is quite a decided depression that is in the country there, and this stream was flowing from the cienega, that is due to minute collections. I don't think it ever had a name. I have always known it as Goucher stream. It comes from the land of Story and Goucher. That stream has been produced in whole or in part by collection works. I hardly think my testimony would be of any value with regard to that because it is all hearsay with me. I simply know the fact that stream flowing on the surface four years ago. I don't know anything about the history of it. I think some small development had been made, for it had been probably opened up before, but I think it was a cienega in the first place. I saw no evidence of an artificial conduit, apparently it was a natural stream when I first saw it. The Pirtle

collection works consist of a crib sunk down to a certain grade the lower end of which was placed very near the bed of the stream, on the easterly side of it; and the development works were carried along to the northwest, as near as possible, without making too many detours to the bed of the stream. In some places departed and in other places was right in the original bed of the stream. We followed it as near as possible without making too severe curves. This trench has been carried a distance of about three thousand feet at varying depths below the surface. The grade of the trench is one foot in a thousand and the grade being more rapid we, of course, soon got below the surface. It varies from the lower point to the upper point from about three feet to twenty-four or five feet below the surface of the land. We measured the water collected there on March first, and there was then 429 inches, under a four-inch pressure. All the inches that I refer to are the Southern California miners' inch, which is supposed to be a volume of water which will flow through an inch square opening under a four-
601 inch pressure. We had measured this stream more or less constantly during the development work. The development work had been completed several months on March 1st. The last measurement by us before that was on November 23rd, 1895, at which time there were 505 inches running. That water comes down the natural bed of the wash for a certain distance of a few hundred feet and then a portion is taken by the Laguna ditch and it is wasted below that in two streams to the Los Angeles river. In the course of my investigations and by means of them, I have not detected any evidence of any subterranean water-course in this section of the country. I think that the water supply from the mountain sources flow down and reach the valley, and then taking a southerly and southeasterly course reach the base of the Cahunga hills, or a portion of this water reaches the base of the Cahuenga hills; which for a natural dyke or dam, which obstructs the flow of the water at that point. And then this water, taking its natural grade to the east, flows off through the gap between the Cahuenga and Verdugo hills. All my investigations lead me to suppose that the subterranean flow is all percolating waters.

Q. And why? What are the phenomena that have brought you to that conclusion?

A. Well, it has been proven that the wells show water all over the valley and we have found the same thing in the bottom of the Pirtle development. We found water at about the same distance below the surface. And it appears to me that it is the same as a saturated sponge. The whole subterranean strata there. The flow of water is governed more or less by the formation of the strata. It slopes more rapidly to the south from the foot of the mountains to the south and southeast than it does along the base of the Cahuenga hills to the east. We haven't made enough investigations to
602 fully determine whether it slopes to the southeast but in my judgment it must slope that way; in the vicinity of the Southern Pacific railroad it lies to the northeast of the center line of the San Fernando valley, quite close to the hills on that side. It

is probably a mile and a half, or something of that kind, at the nearest point to the land sought to be condemned and departs from that perceptibly, almost directly. When I say that where the railroad passes along there must be some inclination to the southeasterly I judge that the strata follow very closely the surface of the ground or are very near to the parallel to the surface of the ground and that is generally true throughout the valley. I haven't found any exceptions to it.

Cross-examination:

The Pirtle development is about a mile and a quarter to the northwest from the Pomeroy and Hooker land. It is east of the Tejunga there, and the Pomeroy and Hooker land sought to be condemned is also to the east of the Tejunga wash. The Pirtle development would be to the east of the streak marked on the map "wash," a little to the north and east. The lower end of the development is located in block 44 of the Providencia Land Company. It terminates in the division line between block 23 and 38. If extended a little further down it would run into block 45 as shown on Exhibit F, referring to the map, marked Exhibit F, which is a part of this statement. Block 44 as shown on Defendants' Exhibit F is to the west of block 45, and the boring development is in block 44 at the place marked on the map "P." I was the originator of the engineering portion of the Pirtle development and it has been done under my supervision. The development draws the water from the land in much the manner as a development of a similar nature would do upon this tract. The material is very nearly the same ex-
603 cept that the material in the bottom of the Pirtle development or accumulation, or whatever word you may wish to use, is a little coarser at the upper end. Probably that is explained by the fact that we are deeper below the surface. If you go to the same depth below the surface on this tract, you will probably find the same strata of coarser material. I think the wells have shown that in general. The Pirtle development, I should say, is a draught upon the same plane of saturation that would supply this proposed development, and the water derived from the same sources. The plan by which we propose to procure the water there is, in a general way, the same proposition and from the same source as near as possible. If a similar cut to the Pirtle development and of the same depth were to be made through block 56, and the blocks west of it, in such a way as to practically parallel our cut and at a thousand feet distant from it, my opinion is that it wouldn't draw quite as strong a stream as is now flowing in the Pirtle development. I think you would get quite a flow of water, but I don't think it would be quite as strong. It would be appreciably less, perhaps two-thirds as much or half as much, or something of that kind. In the territory south of our development and between there and the hills, I don't think that similar ditches constructed in a similar manner and to the same depth, would draw as much water. The Pirtle development indicated a natural flow and consequently a freer outlet at that point than at any other portion of the valley or

in that immediate vicinity. The flow there indicated that some obstruction had been placed there, or natural causes collected the water under the surface there, and, consequently the chances for the development of water would be better there than they would in any other portion of the valley, I estimate.

By the COURT:

604 Q. You mean that the underground flow had been from some cause concentrated there?

A. Yes sir, possibly some obstruction there forced the water to the surface or it might have been on account of the wash being lower than the surrounding country that the water showed plainer than it might at other places. I don't undertake to say which. If you opened a similar cut to that only deeper down and capped the water plane, I think it would be only a question of continuing the development until you secured as much water as the Pirtle development has. The most I have ever measured in that development is 505 inches. That was made before the development was fully completed. There may have been more running since. Those measurements were made by the foreman in charge of the work, and I don't know what figures he has made and I couldn't testify in regard to that. I don't think there is as much flowing there now as there was when I measured it. I think there has been more than 505 inches flowing. I am more or less familiar with the territory south of the Pirtle development where the wells marked "Forman wells" are and where the Laguna is. I think that territory is a very favorable chance for the accumulation of water up there in the vicinity of the Laguna. A valuable place to collect it. I stated that in my opinion, there could be collected from two to four thousand inches on the land in controversy.

Q. Well, I am striking an average. The other witnesses all testified 3,000. And I expect you kind of struck it both ways with the idea of striking about the same average, did you?

A. Well, I didn't intend to put it in that form. I think there is a strong probability of being able to produce 2,000 inches from that water, and there is also a possibility of getting 4,000 inches.

Q. About how many cuts can you make, in your opinion, in that territory, and draw off from 500 to two or three thousand inches out of each one?

605 A. Well, I think the first that cuts in would have the best chance for the water. It would make a great difference how close they were put together, and at what depth they started and to what extent they were carried.

By the COURT:

Q. How do you account for the decrease in the flow of the Pirtle ditch?

A. Why, the channels, when they are freshly opened up, of course, there is quite a bit of material above this curve which has been spoken of, which we all know exists to drain. That has been

draining, and probably by this time it has almost sought its hydraulic level.

Q. It was a sort of a dam to the water in there which has been cut?

A. Oh, no, I don't consider it that way. It was simply draining from each side, Judge, and of course at first these outside triangular pieces lying above the curve, which would eventually be drained of the water, were full of water. And that has been drained out, and I think it has almost reached its normal flow at the present time. And the cut has not been kept cleaned out. The sand has accumulated. It has not been made a permanent feature at all. I think if that cut was cleaned out there would probably be quite a little accumulation of water and could be made to flow still more than it does now. I couldn't state how far back the Pirtle development affects the water plane on each side of it. I have not made any experiments on it at all That could be easily ascertained by sinking a few shallow wells on each side at right angles to the course of that flow. I think the profiles which are here would almost show a very fair sample of the lines which would be given on the Pirtle development, although the Pirtle development curves would probably be flatter and run back further. I might figure a theoretical curve for that water if necessary, but I would prefer not to give any opinion on that subject. It is so easily demonstrated by
606 the sinking of a few wells if necessary. We could go up and do that. I think probably that drain affects the water plane about the center for probably a thousand feet on each side practically. It might not reach the actual water plane at that point, but so near it that for all practical purposes it would end right there. If you went a thousand feet from that in the valley and found the same formation and ran a similar cut in about the same way, you would get about the same kind of water, or rather if you went two thousand feet from it, you would get very nearly the same kind of water, providing the natural conditions were as favorable as they appear at the Pirtle development. By natural conditions I mean the local conditions of the strata formation and so forth. They largely govern the flow of water through that land. I don't think the water flows through that land in any appreciably greater quantity than another. The wells we have sunk there indicate that the surface is underlaid with water at a certain depth; quite a decided average depth, all over the valley. If a cut were made on any of those blocks in the northern part of Exhibit F down to a depth which would correspond to the depth of our cut and far enough from it to avoid the effect it has upon the water plane, say 2,000 feet, I have an idea it would develop the same amount of water, if carried to the same depth or if carried to a lower depth, as it would naturally have to be to get on the hydraulic. I don't think you could drive one of these cuts through each 2,000 feet on that water plane and get about the same amount of water as we have in the Pirtle development.

Q. Suppose you did that, would it affect the surface flow of the

Los Angeles river, do you think, if you drove one every two thousand feet in the territory surrounding?

A. Well, I think it would affect the flow to a certain extent if made to the north of the river, or on territory west of the
607 river, but probably not as much as you imagine it would. It would not dry the river by any means. The surface flow of the river depends for its existence upon the water being under it and the supply; and if the water plane did not come up to the bed of the river or to the river on the sides or on the bottom, the river would dry up.

Q. And the land which is in the bed of the river, unless the bottom is impervious, must come right up under the river and support it, mus-n't it?

A. It comes from under the river and either side.

Q. And if under the river, the land would dry; if the water was to be abstracted from under the surface flow the river would sink into it wouldn't it?

A. I think it would after a time. It wouldn't sink all at once. It would gradually fail. This is suppose there was no supply from above sufficient to keep that up. Of course this supply of the Los Angeles river comes from above.

Q. About how much water do you think could be drained as a matter of fact, any of this land under your theory for the distance of half a mile, say——?

A. It is limited in extent, of course.

Q. But suppose you go north of this tract for a mile, you would still keep nicely within the valley and any of it is nearly as good for the procuring of the water as this, with the exception that you would possibly have to go down further in the water plane, isn't it?

A. If you strike the same level of the water plane I don't think you would get as much water as you do in the bottom. But you would get a good flow of water at any of those points provided they are not too close together and did not run too far back. There is a limit to the extent to which those things run. I am not able to say whether the water runs more rapidly under the lands sought to be condemned than it does under the land back up in the valley for a number of miles or that it does at any other point. I have not
608 made any experiments that I could give any opinion in regard to that. According to my theory this tract marked "San Fernando basin" is all a saturated plane. I think it is all underlaid with water at an average depth and all goes through opposite this land and through this land; between that and the Verdugo mountains. There are no indications of the water getting out of the basin at any other place. Possibly it might get there, but I think nothing in the Cahuenga valley. There is no indications of it there. The inclination of the water plane is very sharp at the north and west of this land. Taking these facts into consideration, whether the underground water flows through this land faster than it does through the balance of the water plane depends a great deal on the cross-section of the channel, or the area of the water that runs in the different channels. On the slope of the San Fernando valley it

comes down in layers; spread out wider. When it comes into the lower levels here, it probably accumulates and becomes a very deep current. Consequently it could go off on a still lighter grade, and still take the water which has accumulated from the valley above, which comes in layers. I know nothing of any borings of the valley above and back, only by hearsay. I have seen one well above about 26 or 27 feet deep. It does not strike bed rock. It strikes clay. We struck clay in the Pirtle development. Quite a well-defined stratum of clay. I think there are several strata of clay underlying that valley. The strata are broken up to a certain extent, but there are well-defined strata of clay and sand, and that is the same under this land. I consider the material of the country through the San Fernando basin about the same that it is down in the valley or river bottom. That being the case, whether the grade of the inclination of the water plane, and its contracted outlet at
609 this point would naturally cause it to flow faster through this land than back above, depends upon the circumstances of the amount of water which flows through this opening here, which comes down from the valley. I think fifty per cent. of all that comes down goes through this land.

Q. Well, in order to go through that land, it would have to go through pretty rapidly, wouldn't it?

A. There is quite a wide space there, Mr. Dunn. I think the wells there, some of them, are 200 feet deep. That is quite a deep channel and will take a great deal of water.

Q. You would not want to call it a channel, would you?

A. I would hardly call it a channel.

Q. When you did call it a channel you rather misspoke yourself, didn't you, Mr. Sanders?

A. It is rather a habit, Mr. Dunn. There are places in the Pirtle cut where the water flows in more rapidly than other places. There are quite a number of places where you can see quite a well-defined flow into the cut. I have not seen the development since it has been completed. I have not been all over it since it was about seven or 800 feet up. I should imagine some of those little streams or accumulations were flowing 3 or 4 inches of water. I don't remember any places where in a very small place we collected as much as 12 or 15 inches. Three or 4 inches was as large a stream flowing in there at the time I saw the development. As far as I could see, it was quite a well-defined stream, except at the upper end. It showed arteries or tributaries which came from the bank and formed that stream. I can't say as a matter of fact that there are running through this valley streams of small size, say as small as a lead pencil or as large as your finger, of a well-defined character. I saw them on the outside of the Pirtle cut, but not that they are in the valley at all. I think those are due to the natural depression of the surface at the surface of the development cut where these streams flow in. They
610 are accumulations from small sources. They might be represented by the fingers of my hand. They form a stream like my wrist, and flow into the Pirtle cut. As far as I could see it

they were very well defined. At the upper end we could see them trickling down in very small accumulations, as I have represented by the fingers of my hand. I have not formed any idea as to the velocity of the water under ground. Haven't figured on it to any great extent. I know there is such a variety of circumstances governing the velocity of percolation that it is a very difficult thing to arrive at. It is not particularly well defined in the books.

Q. Do works in engineering give percolation a velocity?

A. It certainly has a very little velocity, or else it wouldn't percolate. I have never seen a table in works on engineering, by which to determine the velocity of percolating waters. You might consider that there are tables for determining other velocities. I don't remember that I ever read a treatise or paper or engineering work of any kind on the velocity of percolating waters. I don't remember that I ever saw percolating waters treated in engineering works. I understand that it must have a certain velocity to be percolating water. If it didn't move it could not percolate. If it didn't move in any direction. Standing water isn't percolating water. If I had no preconceived idea; if I could remove from my mind any idea which has arisen by reason of this development, I would not have considered percolating water *water* which had, if any, velocity, a vertical one. Percolating water is generally considered to flow very slow, and it must naturally, or it would not percolate. If water was flowing through the soil, parallel to the river, with a well-defined direction at the rate of 25 feet an hour, whether I should call it percolating or flowing in a channel, would depend upon what material it went through. If it was in an open
611 well-defined channel and moved at that rate of speed, I think it would be naturally called a channel.

Q. What do you call a well-defined channel?

A. Why, a channel that can be defined; that has banks and beds, and that is manifest. The same rules, as I understand it, are applicable to an underground stream, that are to a surface stream. We can see this. They are evidences, in fact. We can see the banks of the river and the bed. I certainly acknowledge that there is such a thing as an underground stream. I have never seen one, but I understand from the best authorities that there are such things. If I were to see a stream flowing upon the surface and sinking in the soil, appearing again further down a short or a long distance, as the case may be, I would call the surface flow a stream. I would not call the water which flowed under the soil and came again to the surface a stream unless I could define it. I would want to be sure it flowed in certain well-defined channels before I could consider it a stream. I would necessarily want it to be an open stream, that I could look at it, clear water, without substances. It must have a well-defined channel or bounds in order to be called a stream. If I had a stream with sides and bottom and cemented, and the water flowing clear without obstructions, and you were to fill that conduit with cobblestones for any distance, a hundred yards, more or less, up to the top, you could only run a very small portion of the water through that that you did through the other.

Q. Certainly, but wouldn't that portion of the water that ran through it be a part of the stream just the same?

A. I think you would be obstructing the channel of the stream, so that you practically destroy it. Nobody would put a load of cobblestones in a ditch and still call it a ditch. They wouldn't call it a good conduit for water. It might be called a percolating stream. It would per-
612 colate, but still it would percolate in defined channels. We know that in that case it has been held, if it is in a cemented conduit, if I understand you. Cemented on the sides and bottom. And it can't get out. You would have to raise the sides of that ditch if you car-ied the water to its full capacity, naturally. If it was running in the ditch and the cobblestones were therein for a hundred feet, or a hundred yards, it would still be a stream. I would consider it that way, but I would consider that portion that was running through the stones as being a percolating stream. It is not subject to the same conditions as water flowing in the unobstructed channel. It would flow slower and would take different devious courses. It might get through just the same. If you cemented the bottom and sides of the bed, undoubtedly it would get through, if you didn't put too much water above. I believe that the Verdugo mountains on the upper slopes, the other side of this watershed, is a rock, and that the Cahuenga hills down on the south side are rocks, and I believe that underground all between these, there is what is known as bed rock somewhere. It has been defined at one portion as being over 200 feet deep. I am interested in this Pirtle development to see them make a success of it; no other interest except as an engineer. Am professionally interested alone.

Redirect examination:

I see no difference in the manner in which the water comes in along the Pirtle excavation from the way in which it enters the excavations on the Pomeroy and Hooker tract. There are the indications of water coming from underneath also.

Q. Now, in all of your excavations have you ever found anything in the ground there, any of Mr. Dunn's ditches with cemented
613 sides and cobblestones in them?

Mr. DUNN: I will stipulate there is none there.

The COURT: I suppose that is hardly necessary, Mr. Chapman.

By Mr. CHAPMAN:

Q. Take the case, then, of the cobblestones in the ditch made anywhere. Now, if that ditch had also, or was open to the accession from the sources of the water, of sand, gravel and the various materials that you find, how long, in your opinion, in any ordinary ditch, would the water continue to be even percolating stream through those cobblestones?

A. Well, the ordinary run of ditches would soon fill those interstices up with a deposit; silt them up, and that would become a dam, and Mr. Dunn's ditch would run over, I believe. All underneath

this ground where I have been investigating the movements of the water, I think there is much more sand and gravel and boulders, and so forth, than there is water. A larger proportion than there is of water. From my investigations, taking these little different streams, if there are any such, either of the size of a hair or lead pencil or finger, making their way through the material in this land and the vicinity, I don't think you could define the percolation of that water the minute rivulets. But from my observation of the movement of the water under such conditions each of these streams would be continually shifting their course through the obstructions met with, or the cavings into them, or other like opposing causes; they would vary.

Recross-examination:

When I said that the interstices between those stones in the illustration which was given me of a cemented conduit, would be filled up, I meant by reason of the silt and vegetable and earthy matter that would be carried in a surface conduit. That would not
614 apply to a conduit which was under ground. It is a fact that no silt or other substances are carried in these underground waters, where there is a space of sand of four or five, or eight or ten feet. They are not subject to the same laws regarding cavings and changing as surface streams are.

Redirect examination.

By Mr. CHAPMAN:

Q. I understand you that they are pretty much all sand and gravel already.

A. Yes sir.

The COURT: 70 per cent., I believe.

A. Well, that is about the average. I believe something of that kind. I believe 60 or 70 per cent. of sand and gravel. A large proportion of it is sand. The sand appears in different strata, and in different proportions. In the Pirtle development there is some clay, well-defined strata, mixed with sand. We found none of the gravel with sand.

Q. Well, now, in your opinion, or from your observations, do you know, as a fact, whether or not that sand through which this water is percolating, as you say, is any less compact than it would be if there wasn't any water in it?

A. Any less compact?

Q. Yes sir.

A. I don't know that I understand that question.

By the COURT: You mean if the water was all drained out, would the ground settle?

A. No I don't think it would. But I think the water is flowing through the natural interstices of the material through which it goes. I don't think the ground would settle by the water being taken away.

Q. The water doesn't hold the ground up.

A. In other words, I think the water is flowing through the underground interstices of the material.

Recross-examination:

615 Q. Isn't it a fact, that all these little underground—I would call them channels—little amounts of water, whatever you choose to say, all have the same general direction to the outlet?

A. Why, I think the direction of that underground percolation is constantly varying by local conditions of the strata and formation.

Q. But hasn't it all the same general trend all the time to this outlet?

A. Yes. There is no question about that. When it strikes a deposit of clay, it will go around it or under it or over it, if the pressure is not sufficient to carry it through. Otherwise the whole of it has a common trend and flow all the time towards the outlet. It must be that way for the water to get out.

JOSEPH LIPPINCOTT was next called as a witness by the defendants, and being duly sworn, testified as follows:

L. FRIEL was recalled as a witness for the defendants, and testified as follows: Have resided in Los Angeles city 13 years and am by occupation a civil engineer. Have given attention to hydraulics and hydrostatics. Been engaged in these branches of my profession for the last 7 or 8 years in Southern California, and had experience in developing and collecting water in underground channels at Ontario and in the San Antonio cañon, Glendale and La Crescenta. They have not been generally successful in developing any great amount of water. Have known the tract of land sought to be condemned since 1891. Have made investigations of that section of the country with regard to the amount of its water supply, and the manner it is moving, for Messrs. Pomeroy and Hooker, and have been in their employ for that purpose since the last of November or the first of December, 1895. Am acquainted with the cuts made upon this land. They were made under my supervision. I know the Tejunga creek and the Pacoima. Have been acquainted with them since 1889. Been engaged in surveying through
616 there. There flows in the Tejunga at ordinary stages an average of about 400 inches during the lowest summer flow. That estimate is made at a point about two miles above the mouth of the cañon. The stream is subject to fluctuations during the summer season, as well as during the winter. From summer rains. Have known the creek to be affected to the extent of 150 or 200 inches by summer rains. There was no record kept of the amount of rainfall during those seasons in the Tejunga watershed. That was in July, 1892. I was in the Tejunga watershed at the time. About the center of it, and we had a rainstorm commencing in the forenoon and lasting until after midnight. Have made measurements of the stream of the Tejunga at what is known as the "Point of Rocks" about two miles above the mouth of the cañon, and in

cases it would be a certain amount. For a rainstorm in the mountains it would increase from 150 to 200 inches. I haven't noticed the Pacoima creek in the summer, so far as the summer flow was concerned. I have been there, winter and summer both, but have not made measurements of the stream. The Pacoima disappears in July and August, shortly after it enters the valley. It does not come down to San Fernando or where the railroad crosses the Pacoima wash. In years of excessive rainfall, when the storm is heavy, the waters come down to the railroad crossing for a short period of time. Was there last Sunday at Tejunga. Haven't been at the Pacoima recently. The character of the material in the tract sought to be condemned as developed by those cuts and wells, begins on the surface of what might be termed surface soil. The combination of vegetable matter and sand, and as you go deeper it is sand and gravel and boulders and gravel and sand. There is no place where we find nothing but boulders. Where we find boulders we always find sand and gravel. Larger though
617 than at the surface. At all points in these wells the water stands higher in them than in the excavations or in the river. The cuts haven't affected the plane of saturation on each side over a hundred feet, as far as can be observed. The lower cut is a little over ten feet deep at the upper end. The upper about 12 feet in depth from the surface of the soil. The surface soil at the upper one is very sandy. At the lower sand mixed with vegetable matter. The depth of that soil would average in the lower, at the deepest place, about three or four feet. In the upper there is a very small amount of it. It is in the wash of the main Tejunga. In the upper cut the bottom of it is about four and one-half feet or 5 feet below where we first strike water and the plane of saturation is not affected more than a hundred feet on each side. I have a profile showing the line of saturation by each line of wells, which I placed 75 feet apart at the lower excavation and a hundred feet at the upper. The plane of the water level does not vary very greatly above the surface of the water in the cut and in the river. It has not varied in the last month to amount to anything. The water at present in the wells shown on Exhibit F upon the line C C, stands at present and for the last month, about two and a half feet higher, that is the water in the well, than either the water in the river or the cut. The water stands higher in the wells between the river and the cut. Upon the line C C the plane of saturation is not affected over 60 feet upon the northerly side of the cut and about the same on the southerly. The nearest well from the cut is about 75 feet. The cut drains the land from the center of the cut to each side of the cut for a distance of about 60 feet, and the cut receives the supply that maintains the quantity from the water that comes below. The water comes into these cuts from the sides and the end and the bottom. I have been all along them.
618 Measured the water at various points. The water in the lower cut at the head begins practically at nothing at the upper end and increases at the mouth to about 121 inches flow. The increase is very gradual from one end to the other. You can observe no differ-

ence as to the quantity of water that is coming in on one side of the cut or the other, and the same is true of the upper cut. In the upper cut the water *is* also comes from underneath and from the sides. The material in the two cuts after you go below the surface of the soil, is very similar. Principally sand. In a few places some gravel. No large boulders. Gravel, say the size of your fist in a few places. The water that we developed in this land or that is in this land comes through the land from the upper portion of the San Fernando valley or basin. The direction through the San Fernando valley of the movement is southerly and southeasterly. The sources from which this subterranean water is supplied is the rainfall upon the watershed of the San Fernando basin, the extent of which is about 486 square miles. Have made an estimate of the average rainfall of the watershed from the rainfall that has been obtained from observations at different points in the San Fernando valley and adjoining the San Fernando basin. The rainfall in the mountains of this section is greater than the rainfall in the valleys. I estimate the average rainfall of the watershed at 24 inches per annum. That would be about 42,985 inches under a four-inch pressure, constant flow for the year. In making my estimate I have allowed 55 per cent. for the run-off and evaporation and plant life. I consider it a safe estimate. That would leave 19,320 inches. In run-off I include the flow of the Los Angeles river and the storm waters both. That is the constant flow and the storm water. After this water that makes its way into the soil of the San Fernando basin leaves the watershed, it moves southerly and southeasterly
619 until it strikes the Cahuenga range of hills. By the mountain watershed I am referring to the mountains to the north and east. From the mountains on the west the water from that would move in a southeasterly direction, and easterly, and when it met the waters from the north they would, to a certain extent, have a tendency to deflect the movement of the water from the west as well as from the east and north. All the waters, or nearly all, come toward the Cahuenga range of hills, and then is deflected in an easterly direction around the point of the Cahuenga range of hills, and after they reach the point they then move in a southerly direction. There is no other mode of exit for these waters to my knowledge than through that pass between the Cahuenga and Verdugo ranges. I think that about 50 per cent of this flow would pass through this tract of land. That is, of the 19,000 inches. And that is not taking into account the flow of the Los Angeles river. I know the entire Pomeroy and Hooker tract of 1,400 acres, of which the land sought to be condemned is a part. The remainder of the tract lies south and west of this tract. The highest elevation upon the northern side of the tract sought to be condemned, is at the northwest corner, the southern portion of block 65, and that is 507 feet. That is on the 26-acre tract, part of the 314. The highest elevation on the southern side, it is approximately 750 feet. On the part of the Pomeroy and Hooker land lying to the west and south of this particular tract, not included in the condemnation suit, and lying on the river, is as far as the indications go, similar

to the land in question as to the material beneath the surface. The Los Angeles river runs through the land for a distance of about a mile, or a mile and a quarter. From all indications away from the Los Angeles river and underneath the surface, the principal portion of the land is water-bearing, and continues through that
620 section of the land, as well as that which is sought to be condemned. I have not made examinations at that particular point to ascertain what depth below the surface the waters lie, but 10 or 12 miles above and running from that down to the Los Angeles river I have. I don't think it would be feasible or practicable, as a business proposition, to develop or collect waters flowing in the tract of land belonging to the defendants to the west and south of the tract sought to be condemned, and get out of there with them to any place where they could be utilized and disposed of without crossing the tract of land sought to be taken here. Not if the development is from the lowest point upon the land, and if you don't develop upon the lowest point the supply of water you could obtain would be so much less that it wouldn't be advisable and business to develop it. The investigations by means of those wells and cuts has been from the easterly end of the 314-acre tract to the westerly and from the southerly side to the northerly, all over the entire tract. We find water over the entire tract, with the exception of the mountain portion, where we didn't make an examination. Those mountains rise above the general level of the ground there, in the neighborhood of 300 feet. They are covered with brush and some oak trees. Some of the oak trees are in the upper portion. The greatest or largest quantity is in the eastern portion, and over the land are willows and alders and some few sycamores. The willows and alders where they grow are very dense. Cover the whole bottom. You can't see through them. You have to cut your way through when you wish to make the line. When making these lines we had to clear the way unless somebody had cleared it first. There is some places you can hardly walk through. Where these excavations were made there was a dense growth of willows over the greater portion of the cuts, and we had to grub
621 them out to make the cuts. I know where the main tunnel proposed to be constructed by the city is located. Commencing at the easterly portion of the tract of land there are willows for the first one thousand or fifteen hundred feet. Then until you get to this point that is marked "Diversion dam and levee" it runs under a mesa that has no timber upon it. Then after that we leave it, and running westerly to the west portion of the tract, it is nearly all the distance willows. At the eastern end of the tract there is oak timber. On the northern slope a few trees running down south of the letter "J," (referring to the map). The willows are from an inch in diameter to six or eight inches. A great many belong to the class six or eight inches in diameter, located upon what is termed the second bench or willow land of the tract. Am acquainted with the proposed laterals or filtration galleries, and their location that the city proposes to construct. Know substantially their length. In my opinion the amount of water that could be collected

by the construction of the tunnel and laterals in a proper manner, in that land, and without drawing from the Los Angeles river, is about 3,000 inches. I know the Pirtle development. Have seen the water. The character of the material in the excavation is somewhat the same as in the Pomeroy and Hooker tract, sought to be condemned. In the bottom it is somewhat coarser. The Tejunga creek is shown on this map. At the point marked Tejunga stream, the water flows on the surface. About 137 inches empties into the Los Angeles river. I have obtained information from wells that have been bored outside the Pomeroy and Hooker tract sought to be condemned, and it contains water. I can determine the slope of the water. Which way the surface slopes. It is southeasterly. The Cahuenga range lies immediately south of this tract. There is about
600 acres of the Pomeroy and Hooker tract sought to be con-
622 demned and the remainder of it is south. The waters coming from the mountains, a great portion of which must come through the Pomeroy and Hooker tract west of the tract sought to be condemned, that portion of the remainder of the 1,400 acres just south of it, I couldn't say. I believe not. The waters come against the Cahuenga range along the en- length of this tract, and the indications are the same with reference to that portion of the Pomeroy and Hooker tract immediately west of it. The waters that pass down through this tract to the west until they meet the Cahuenga hills, would be deflected easterly through the tract of land sought to be condemned. There are oak trees upon the mesa part of this land, that are about two and a half feet in diameter; maybe a little more. There are some within the headworks that are within 100 to 150 feet on the southerly side and south of the proposed tunnel. There may be one or two north of the proposed tunnel, near the head of the cut. There are some just south of where the Tejunga stream intersects the Los Angeles river. There is one there that is three feet in diameter. I estimate the cost of construction of the development work on substantially the plans proposed by the city at from $110,000 to $125,000. I am acquainted with the value of water per inch in this section of country, to a certain extent and have been for the last four or five years. The value of an inch of water, measured under a four-inch pressure, upon the ground in controversy, already developed or collected, and in quantities sufficient to make it worth while to develop it, say a thousand inches or upwards, would be worth, say, five hundred dollars an inch, or more. Am pretty well acquainted with the country all through Los Angeles county. The character of the country west of Los Angeles city and south of the Cahuenga
range, is a sloping valley or mesa. The elevation at the
623 westerly boundary of the city of Los Angeles is about three or four hundred feet and running to the ocean at Santa Monica. Nearly all of that portion of the country is in cultivation. There is a small portion in citrus fruits near Hollywood, and from the cultivation of it and my knowledge of it and the orchards that grow upon it, and everything that enters into my knowledge of the country, it is very valuable for agricultural and horticultural pur-

poses, exceptionally so, and the extent is about 50 square miles. I know the elevation of the land in controversy, and of that 50 square miles lying south of the Cahuenga range and westward from Los Angeles to the sea, could be covered by water developed upon this tract of land by gravity alone, all but about 8 square miles; that 8 square miles would lie immediately west of the Los Angeles river and south of the easterly end of the Cahuenga range of hills. Am acquainted with the lands east of Los Angeles city in the Laguna ranch, in the Rapetta ranch, in the country from the east boundary of Los Angeles city to the San Gabriel river. The quality of that land is very fair for agricultural purposes. The Laguna ranch and portions of the Rapetta ranch could be covered by waters brought from this tract of land by gravity. Have been out along the roads east of Los Angeles to the San Gabriel river, towards Whittier and that country. The slope is—it falls off from the city of Los Angeles and from the range of hills to the north it falls southerly and it is to the south of the tract of land in controversy. In the Cahuenga country there is only a small portion of it that is supplied with water and that supply is very limited. To the east of the city they have no supply for the Rapetta ranch, I believe, and a limited supply for the Laguna. The Los Angeles river now runs, after it leaves the levees in Los Angeles city, in a southerly direction,
through a portion of the Laguna ranch. I believe that a
624 considerable portion of the Laguna ranch, which lies to the
north of the Los Angeles river, could be supplied with water from the Los Angeles river. About three-quarters of the city of Los Angeles could be supplied from this tract by gravity alone, and the portion that is out of reach of the water would be in the higher hills. In the northern and northeasterly portion of the city and northwesterly. Those portions which would not be within the reach of this water are not settled as thickly and not improved as extensively as the other portions of the city. No part of the business portion of the city is in any of those sections, and with the exception of Angeleno heights, as it is called, there are no portions not within the scope of this water supply thickly populated with residences. Where the Los Angeles river enters this land on the west, there was 1,073 inches flowing; at the lower end there were 2,062 inches. The Los Angeles river between those points does not receive any sudden influx of water from any place that I have observed. The increase seems to be gradual from the percolations from each side, and also from the water from below. I have not been all along the Los Angeles river, but I have been upon the river in hundreds of places, and traveled up and down it for a greater or less distance many times. I could see on the banks of the Los Angeles river that it is supplied by percolations from the soil. Can observe in the bottom of the stream evidences as to whether any portion of it is supplied by an upward pressure. There is no material difference in the manner in which the Los Angeles River waters are increased from one of these points to another, so far as my observation goes, from what occurs in the cuts that were made. They are very similar. I made

measurements of the water in them during the progress of the work of the lower excavation. When the lower cut had extended about a thousand feet in length, I made a
625 measurement. There was about 60 inches or a little over flowing at that time at the mouth. On February 15th we made a measurement of the development and found about 121 inches, on March 1st, about 125 inches at the mouth. We had on the same day measured the water in the cut at 300 feet from the upper end of the lower cut and found twenty-five and one-half inches. I have measured the water in the ditch used by the city of Los Angeles, that connects with the river on this tract of land. On February 15th, February 17th and March 1st. I have other measurements, but I have not the information here. On February 15th, at weir No. 1, located at the headgate, I found about 476 inches. On the same day at weir No. 2, about 2,000 feet below, 463 inches; on March 1st, at weir No. 2, 934 inches. The upper cut is located about three-quarters of a mile westerly from the head of that ditch higher up the river. The lower end of the cut is about that distance above the headgate of the ditch, and the cut extends in a northwesterly direction and from the point that I was making the estimate, it would recede further from the ditch than the lower end of it. I measured the water in the upper cut February 15th. Found 76½ inches at the mouth. Measured it at 300 feet, or in the center of the excavation; found 17¾ inches. The increase in that cut is a gradual increase. At the head of the excavation there is practically no water. It commences at nothing and increases to 76 at the lower end of the cut. I took the velocity of the Los Angeles river first September 21st, 1893. At the wire fence at the eastern end of this tract in question. The velocity there was about 2 feet per second. The water was then at about the average flow of the water in the river, not affected by floods. Next velocity I took on February 17th of this year at about the same place. The velocity was two and one-half feet per second. At that time there was
626 some flood waters in the Los Angeles river. From the northe-ly slope of the Cahuenga range, proceeding from the rain that had been falling the day before and was then falling. Measured the quantity in the river at that time, and at this point there was 3,800 inches flowing. Never measured the velocity of the river at any other point on this land. There are no falls in this river channel after the stream enters the western boundary of this land, either on the land itself or elsewhere. There are no sudden and abrupt changes in the flow of the river. The grade through the land is not uniform, but no sudden changes. Have assisted in making examinations to estimate the velocity of the subterranean waters through that section of the country. At the upper cut the amount of water that was shown by a cross-section of the cut, showed a velocity of about 17 miles per year, at the lower 14 miles per year. The conduit from which that computation was made was derived from the movement of the water right at the cut. And the tendency of the cut itself upon the water moving upon the slope of the drainage of the water of the cut, would accelerate the motion of the water.

By the COURT: How do you make that calculation, Mr. Friel?

A. By taking the cross-section of the area drained and platted it geographically and finding out how much water that a certain cross-section would deliver. How much water would be passing and was passing through there, and how much had been drained. From my investigations and tests made, both by the wells and the cuts, in my opinion, the clay formation through that section lie in strata, but I don't believe that the strata are continuous from one well to the other. I think that because we cannot, with possibly one or two exceptions, plat or locate the strata from one well to another and have them to conform to any, seemingly, possible grade. The strata are all of different thickness at different places. They are more in
627 the nature of deposits here and there, made as the water passing there filled up in past years. Yet, at the same time the formation seems to be a little different. For instance, above and below them which shows that there are possibly strata at that particular point, but, as I say, they do not seem to extend from one well to another. They are not the same elevation, the same grade, you might say, or same plane. To avoid drawing from the surface flow of the river, I would locate the tunnel or filtration galleries away from the river; a distance from it. Or if I should construct a tunnel under the river make it water-tight so that the water would not enter it. That would increase the cost. It would be necessary to use concrete. It would be greatly in excess of the ordinary method of running a tunnel; probably 100 per cent. or more.

Q. For what distance would that kind of a conduit be required to protect it?

A. If you were crossing the river at right angles, it would be necessary to make a water-tight tunnel for a distance of about 250 or 300 feet. If you were crossing it in the manner indicated on that map, it would be necessary about 250 or 300 feet, so that the increased cost would be about as much for the construction of, say 900 feet of the tunnel, as would otherwise be required. Where the tunnel crosses a section of the bed of the stream at the west end, it would be about thirty feet below the surface. A tunnel constructed under the bed of the river, at the depth of thirty feet, without protecting it against the surface flow of the waters, would affect the water on each side of the cut to a distance of about 700 feet; and if the river was taking its supply from that same cross-section, you would affect the water in the river; if the tunnel were laid near to the surface, say four or five feet, it would affect the surface flow more.

Q. Do I understand you, the deeper it is laid, the greater
628 would be the extent on each side to which the surface flow would be affected?

A. The sheet water, as we might term it, would be affected about 700 feet or 750 feet upon each side of that tunnel or cut. If it was running beneath the surface of the river at a depth of five or six feet, it would not affect the plane of saturation over a hundred feet on each side. It would affect the river more, provided the material between the tunnel and the river were porous, to allow it to filter

through. If the material of the bed of the river was impervious and you put the pipe below the impervious stratum, it would not affect it at all. But the material being the same if the tunnel crosses the river bed at a distance of four or five feet below the surface, it would affect the river more than if it was passing at thirty-two feet. The upper cut is 600 feet in length and the lower 1,500. The plane of saturation is higher between the Los Angeles river and the cut, than the surface flow of the Los Angeles river, or of the water in the cut. The water between the Los Angeles river and the cut—of the upper cut—stands about four and one-half feet higher than the water in the cut or river, and it stands about a foot higher than the water in the Tejunga stream. The same is true in all of these wells.

By the COURT:

Q. What is the condition of the land to the left of the Tejunga that makes the land so slightly elevated above it, to the north.

A. I don't know as I understand your question.

Q. To the right there, I meant to say.

By Mr. CHAPMAN:

Q. What is the character of the country that makes the condition of that elevation different?

By the COURT:

Q. There is a very little elevation above the stream there, at the north of the Tejunga. What is the cause of it?

A. Oh, that is the upward pressure that causes the water to rise.

629 Q. Well, but why does it rise so much less there than anywhere else.

A. You are then coming out of the upward line of this pressure. You are then coming into the grade line of the waters of the San Fernando valley. I don't believe the flow of the water in the ditch used by Los Angeles city has any effect upon the waters that are collected in this lower cut. It may have a little, but it is very little. I don't think it is appreciable. I haven't discovered in my investigations in that section any indications of the existence of a subterranean water-course, at any point, where these wells have been sunk, or excavations made, either in this tract of land, or in the vicinity, so far as they have come under my observation, haven't presented any material difference, one from another, as to the character of the soil, or as to the character of the movement of the waters underneath. These investigations that I have made of the water in the San Fernando valley extends from this tract to the city of San Fernando, and west for about 14 or 15 miles. The width of that valley at this tract between the Cahuenga and Verdugo ranges, is about two and a half miles. These borings have extended across that tract northwesterly about one mile.

On March 17th, the trial was resumed and L. FRIEL was recalled and testified as follows:

I have been upon the tract of land in controversy since the adjournment of the court at Saturday noon. Have taken the velocity of the river at points other than those which I gave. Took the velocity at four points in this tract in question. The first point was at the western boundary of block 65, westerly end of this tract. Velocity two and one-half feet per second. The second a little west of where the line between blocks 66 and 67 produced would strike the Los Angeles river; velocity 2.2 feet per second. At the road crossing, little nearer the line between block 66 and 67, 3.3 feet per second. Number 4 was at a point between the
630 mouth where the waters of the lower cut enter into the Los Angeles river and the easterly boundary of this tract. Velocity was 2.6 feet per second. Took more particular notice of the oak trees on the tract. Some are on the mesa or second bottom land, and the balance on the mountain side. Those on the mesa are about the edge and running from 25 to 40 or 50 feet in elevation above the river. Size of the trees on that mesa from a foot and a half to five feet in diameter. A number of them are to the north of the line of the proposed tunnel. A large oak tree about 450 feet north of the line of the tunnel, lying a little east, about 60 feet east of what is known as the lateral No. 1. That one is five feet in diameter, a foot from the ground. There are two other oak trees east of that. One of them, six inches in diameter, and another, which is a double live oak, eight and twelve inches in diameter. Between that point and the headworks there is another that is two and one-half feet in diameter. That is at the head of the city ditch. Upon the upper end of the tract, commencing where lateral No. 4 intersects the main tunnel line, and running easterly for 500 feet, there are 12 oaks, ranging from a foot in diameter to 3½ feet. Also willows, running from small saplings to 2½ feet in diameter. There is one 1¼; another 1½, and another 2½ feet in diameter.

Q. And about a quarter of a million of others?

A. There is a great number of the others, yes sir.

The effect of the waters approaching from the north to the south and meeting this range of mountains on the south, is to back it up and raise it up above the gradient of the San Fernando Valley grade; from ten to 15 feet perpendicularly, and that would affect the back water about 2,000 feet in width to the north. That would extend about to the high bank upon the north to the Cahuenga range of hills. The northern edge of the flatted grade is about coincident with the line of the mesa on the north side of the river and
631 coincides with what you call the river bottom, or bed of the river, or lower land. It backs the water up or changes the grade for a distance of about 2,000 feet.

Cross-examination:

The work I did in the San Fernando valley a few years ago up in the Tejunga was for Barclay and Wilson. Latterly for Governor

Merrill. Have worked there since, I think about 1889. The object was to store and bring water from Tejunga shed out upon the lands lying below, for irrigation purposes. Plan proposed was to put in a dam across the Tejunga. Submerged dam, and storage dams, using the cañon as a reservoir, and collect as much of the underground flow as we could, and collect the surface or storm water. The effect in my opinion would have been to have saved the storm water- that would run off to the ocean, and we would have utilized them upon the lands below. The effect of collecting and retaining the underground flow of the Tejunga, on the Los Angeles river, if it was used upon the San Fernando lands, allowing a certain amount for evaporation, would have been nothing. To carry it outside of the San Fernando basin, I believe it would affect it. The Tejunga is the largest of any one watershed in the basin. The flow will average all the year through in the Tejunga, about 400 inches. Summer rains and the natural drainage of the watershed. The Tejunga is the largest source of supply into the San Fernando basin, and of the Los Angeles river. If we had put a submerged dam across the river at that point, and taken the waters by means of water-tight conduits out of this tract and down in-o the plains below the city of Los Angeles, it would have taken just that much water from the sources of the supply of the Los Angeles river, and would certainly have an effect to reduce the water plane just that much, and reduce the surface flow to some extent. Am familiar with the condition of affairs in San Fernando basin. Have been over it all ex-
632 cept the northern and western, the mountain portion. Have worked over most of it and observed nearly all of it. I know the character of the material on the southwest half of the San Fernando basin, from a point at San Fernando, following around the Chatsworth Park country and out in the center of the basin, as far as the surface indications are concerned. The westerly portion of that tract, the half-westerly portion, is what you might cal! good farming land. The eastern portion cut up with washes and is all a sandy material. The mountains surrounding the basin are rock; different kinds of rock. The whole body of the basin, in my opinion, is bed rock, at some depth. All the earth that is in this basin has, in my opinion, been deposited there at some time or other by means of water, brought there from the surrounding hills. The northern portion of the Cahuenga range of hills is, to a certain extent, sandstone. The southern portion and a little more than the southern portion of the hills are sandstone. In the Little Tejunga and the Pacoima there is a great deal of sandstone, but in most of the Tejunga it is granite. The mountains from San Fernando peak down around Chatsworth Park, and that shed, is sandstone. And the character of these mountains lying west of the Little Tejunga is a sandstone formation, and including a portion of the Little Tejunga. When you get down to the Big Tejunda the granite formation begins. The land what I call farming land is to a certain extent a sandstone deposit. Disintegrated sandstone, if combined with a certain cement that seems to exist in the material, would be pretty nearly impervious. The southwest part of the San Fernando basin

is grain fields and orchards and is a fairly cultivated section. I don't think that the water which comes in the southwestern portion of the basin is all consumed to preserve plant life. The watershed on the west and north, it is true, is short,
633 but, nevertheless, the material is of such a nature that the water sinks away very rapidly in it, even if it is washed, or whatever it may be, from the sandstone hills. That I have observed after being out upon the ground immediately after rainfalls. The water sinks very rapidly, even in the western portion. The greater portion of the water certain flows from the northeast and eastern portion of the valley. There is a much greater flow of water through the disintegrated granite formation than there is through the disintegrated sandstone formation. It is not my opinion that the water which supplies and creates the Los Angeles river almost all comes through the land which is covered by the series of yellow lines on Defendants' Exhibit G., called "washes." The San Fernando basin itself is about one-third of the entire watershed. There is 140 square miles in the Tejunga watershed. The water which falls in this locality, which is covered by the Tejunga stream, as far as the surface indications are concerned, show that the storm waters come through the land marked with yellow washes in the northeastern portion of the tract. The material, as far as the borings of the wells show, seems to be the same from the Verdugo hills about 14 miles west of the Verdugo hills. Very little difference, as far as the underground formation is concerned. I know of borings being done at the Los Angeles Farming and Milling Company ranch, called the "home ranch," which is located near the southwest corner of what would be township 2 north, range 15 west. That well was bored 449 feet. I wasn't there as the time of the borings. I was saying that this was obtained from the best information on that I could get, which was the proprietors or the owners of the well. I didn't see the refuse that came out of the well. I don't know what proportion of the underground water which supplies the Los Angeles river, or the underground water of
634 this watershed, flows between the Garnsey & Howell well and the mountains, but we can see by the elevation of the surface plane of the water that the grade of the entire valley tends towards the eastern point of the Cahuenga range of hills. There may be obstructions or something to deflect the underground water, but I wouldn't like to give an opinion as to the amount. It seems to be thrown in towards the Cahuenga range of hills, nearly all of it. A larger percentage doubtless flow- through there than through the balance. The velocity of the surface flow would be regulated by the grade of the water. These washes at the point of the Tejunga indicate the surface flow and indicate the best grade from there down to this land. In that kind of formation it is an absolute rule in general that the underflow follows the same grade, and the grade which furnishes the flow for the surface water, supposing the material underneath to be all of the same character, will give you approximately a rule for the underground flow. The points that I know that observations have been taken of the rainfall by means of

a gauge are at the San Fernando station and at the home ranch, near the centre of the San Fernando valley. At the home ranch it is about an inch and a half or two inches less than the fall in the city of Los Angeles, and at the town of San Fernando it is about one inch less. Those places are higher than the city of Los Angeles. There is a reason for the rainfall being less. It is a variance from the ordinary rule. The ordinary rule is that rainfall is greater in elevated territory. In my opinion, the reason for the rainfall being less on this basin than it is on the lower plain, is simply that the conditions of the atmosphere is such that it does not cause the precipitation. It may be warmer, or near the temperature of the storm *could*, and that is made by the difference that would exist in the San Fernando valley. The cause is the heat from the San
635 Fernando basin itself. The temperature is higher. I have not observed the temperature, but we know that the higher we get the temperature lowers. That is what caused the greater precipitation. Also, at that point there is a certain amount of precipitation that is drawn from the clouds by the Cahuenga range of hills. There would not be a certain amount of dry air drawing from what we call the desert above it down over and across that valley, when we have our southerly winds. The direction of the wind when you get to the mouth of the Tejunga is from the southwest to the northeast. I believe it is a fact that even in the winter time the air is usually found to be drier in the San Fernando valley than it is here in Los Angeles, and that north winds usually precede rains in that section, but it cannot be a fact that north winds bring down a dry atmosphere from the desert, because as we go up to Gleason peak, which is about the highest peak in the Tejunga range, the rainfall is greater than it is at a point lower down, say San Fernando, and that is nearer the desert.

Q. While that is nearer the desert, wouldn't the dry air of the desert go over that peak and up in there with the same facility that it would go through this lower——

A. It would seem to be more.

Q. Sure of that are you?

A. Well, I don't know, but I say on account of its being an exposed position that it would be.

From my observations, I think that the saturated wind currents in this country are from the southeast, and they would strike the Cahuenga range of hills and lose a portion of their moisture, and striking the San Fernando basin and losing some of the moisture in the Cahuenga range, there would be less rainfall in the San Fernando, and at the same time the absorption would be greater by the dry air. The high mountains of the Verdugo would also apparently cut off a material
636 portion of the currents, but the elevation of the Verdugo is a considerable altitude, and the elevation there is considerably lower, and would result in a lower precipitation, which is caused by that in the Verdugo, comes into the river below this land, and that would not furnish any water to the southern and eastern portion of it. Some of the western portion, I believe, it would.

Q. Now, Mr. Friel, do you think that there is such a thing as underground currents of water of any kind?

A. I don't see any reason why there should not be in some cases. I think I have seen it myself. What I call an underground water-course would be a course enclosed with bottom, sides and top, and would not be obstructed by any material which would cause the diminishing of the flow of the water.

Q. Well, it would have to be in short a hole through underground, similar to a gas pipe?

A. Certainly an underground stream, the way that I understand it, would have to be something of that kind, that the flow of the water would not be obstructed. And if the flow of the water was retarded by any other object, whether I would call it an underground stream would be owing to the rate of retardation. If it would retard it only, say, one-half of the velocity at which it would flow upon the surface, I don't know but I would call that a stream. I can't say that I have got a line fixed in my mind in which it is an underground stream, and at which it stops being one, but I would say that if the velocity of the water is diminished from six hundred to a thousand times, I would not call that an underground stream. It would be percolating water. If the waters of the Los Angeles river are flowing on top and under the bed at about four, six or ten feet, there is water running, following the same direction in the same manner, that is running nine or ten feet an hour, and the river is running two or three feet a second, the
637 river would, in my opinion, be a stream and the water under it would be percolating water. Any water that would be retarded to a considerable extent less than the flowing upon the basin in the stream, I should call percolating. The water of the river is held up because at this particular point the ground underneath is entirely saturated and there is also an upward pressure that is forcing the water up in the way it passes through this land. I should say there is silt in the Los Angeles river.

Q. How could there be any silt in the Los Angeles river and the water come up from the bottom and bubble up?

A. Simply because the pressure forces it up. Then it flows away. It cannot be every foot or every inch. There is no defined continuous body of silt in the Los Angeles river, right along, because the solids have a tendency to distribute that. I have testified that the water bubbles up in about the same way the whole distance and that there was no point where the flow appeared to be particularly greater than it was at any other point. If the water bubbles up in the same way for about the whole distance there could be silt carried down. The fine material could be carried down from the upper portion of the land and also from the percolations and from the side of the stream and the water in the river is carrying that off all the time and bubbling up from the bottom all the time. If it bubbles up it has to have a place to bubble through. If you were to draw from the saturation plane in such a manner as to draw the water from under that river and leave the ground dry under it, the river would sink into it, providing it is not too far away, and there is no

intervening and impervious material. If you were to put a tunnel within five hundred feet of the Los Angeles river, parallel to it, at a depth of 32 feet, it would draw the saturation plane down on a curve of 700 feet on each side. At 500 feet the veins of the tunnel would not reach the river, and the result
638 would be that there would be the same water in the river. You would have to get your tunnel located so far below the bottom of the river that the curve to the river from the tunnel would be lower than the bottom of the river. At 500 feet the curve would not be under the river bed. What I mean is that at 500 feet the curve would be so slight that it would still be higher than the bottom of the river. If the curve of the saturation plane is lower than the bottom of the river, then the river will fall in there to fill those voids, and enough of this could go in there to drain it all, if you located deep enough to drain all the water in the river. It is probable that that portion of the basin marked on the map as washes of the Tejunga and Pacoima were formed by waters of the Tejunga and Pacoima, and that portion of the basin should be composed of decomposed granite. At the Pirtle development the material is granite to a certain extent. All the wells we bored were that formation to a great extent. All these washes are composed of decomposed granite. Materials that we found in the wells are not decomposed granite formation, but broken rocks that have been smoothed off by the action of the water in rolling them down and over and over. Has rounded them. They probably were square or rough or broken when they started. When the waters of the Little Tejunga came down originally and found this formation, they carried with them the boulders and rocks and coarser material that you find down under all this formation, and those boulders and rocks and heavier gravel and material, struck the bed rock and deposited itself nearest the centre of the stream as it originally flowed, and when you find the bed of a mountain stream you will find where the flow has been rapid that the bed is composed of the coarser material and the flow on the sides of the stream is very slow as compared with the flow in the middle, and on the sides of the stream the deposits are
639 of the lighter material, but not entirely so, because all the materials that are brought down as variations in the flood, it will deposit between those larger rocks and boulders. The smaller particles. It takes the more rapid stream to hold up the heavier material and carry it along, than the slower stream, and the places where there is a more rapid stream will carry the heaviest material the furthest. In building up the valley, as I understand it, it is not necessary that all of the coarser material should be in the center of the stream; it will be deposited upon the sides also by reason of floods which come and spread it. As a general rule at other times when there is a flood, the coarser material is carried down the center of the stream in the rapid flow, and the finer in the banks. It is a fact from my observation that there is a strip of the valley, down the easterly portion of it, a width of about five miles upon the eastern portion, where the surface indications are more sandy than

any other portion of the San Fernando valley, I believe. I believe that on the strip of five or six miles in width, I believe there are boulders, and there may be, and I believe is still further west. I believe there are boulders where the home ranch is and all through that country. The formation may not be the same, but is similar. That formation is found in the Garnsey and Howell well, and some wells still further west. They were bored by the owners of the land and I got my information from them. I have seen the formation that came out; been at the place in some of the open dug wells and have discovered the formation down to the water at a depth of about 80 feet. Formation about the same as in the wells that we bored at the lower end of the tract. The wells at the Farming and Milling Company's land, about three or four miles west of the Garnsey well and another about a mile and a half west. One of them is a little east of the southwest corner of township 2,
640 north, range 15 east. I investigated all the dug wells; of course I could not investigate the bored wells. I believe that a cross-cut into the soil at a point west of the Garnsey Howell and wells, such as we have made on the Pomeroy and Hooker tract, would, if you got below the saturated surface, produce water. The saturated plane at that point is about 100 feet from the surface. Between that place and the Garnsey and Howell it is about 50 feet. At the Garnsey and Howell well it is about 150 feet. That well is about 816 feet above sea level. I think that the inclination of the water is still west of the Howell well, and it is presumed that the water flows or moves further west, coming even from the Tejunga than the Howell and Craig well. I say a portion of the underflow from the Tejunga comes out here west of the Garnsey and Howell well. It evidently spreads out over the valley. To overcome the resistance in passing there it must spread out. Know the Pirtle development. I don't think that a similar cut at any of these cuts would strike so pronounced a flow and in such a quantity. It is not my opinion that the reason that he has so pronounced and clear-cut a flow is because he has struck a strong place in the underflow from the Tejunga. He has gone in below the surface of what is termed the sheet water and is simply draining an area of that land. But the underflow can't be so very strong, any more than any other portions similarly situated. A cut sim-lar to his put anywhere across this valley, in the same material and at the same depth below the water plane would develop the same amount of water. I can't state that there is the same material. The indications are that the material in general is the same. Of course it changes to a certain extent. The material is coarser in the Pirtle development than in the cuts we have made upon that Pomeroy and Hooker land. The flow of the water in the
641 coarser material would naturally be stronger. There is a greater amount of water comes out in the Pirtle cut to the area exposed than in our cuts.

Q. Well, if a greater amount of water comes out to the area exposed, there must be more flowing in that particular area than there is in other areas.

A. Well, the coarser material allows it to pass through it faster than if it was sand or finer material. I do admit that there are places through this plane where the material is of such a character as to admit of the water flowing faster than it does in other places. I have never denied that. I don't claim that the water is flowing under all that just alike. The coarser the material the faster it moves; and there are places where there is a much stronger and well-defined flow than in others. Our experiments show the velocity of the water in the cut—the upper cut—of about 17 miles per year, and fourteen miles in the lower cut. Seventeen miles a year would be about 9.8 feet per hour. The underground flow follows the same general course as the river, and the calculations gave a velocity of about ten feet per hour. In the material of which that land is composed, in my opinion, about one-third is water and two-thirds sand, gravel and soil.

Q. Therefore, if you were to cut what you engineers call a cross-section of it, a trench right across here at any point, showing the whole face of the land and down to bed rock that exposed face would carry about one-third water and two-thirds other material?

A. About one-third of that would be water. Moving, I say, as the calculations show it to be, at about the rate of ten feet per hour. Following the same general direction all the way, and I say that about fifty per cent. of the total amount of water that is coming down through that gap passes through this tract of land and a great proportion of it from the Tejunga. I don't think that 75 per cent. of the water which flows through
642 this gap between the Cahuenga and Verdugo hills comes from the watershed of the Pacoima, Little Tejunga and Big Tejunga, because there is the San Fernando basin and the hills upon the west and north that flows down a great amount of water. If about 75 per cent. of that water came through that it must receive a greater portion of the water from the San Fernando basin to the west and of the hills to the west. It would make too much water running through the land. If 24 inches of rainfall falls upon the plain which is not mountain watershed, it is porous a great portion of the rainfall will be taken up by the soil and a certain amount to plant life drawn back if it doesn't go too far below. I don't know as I can state in reference to the amount of rain it takes in southern California under ordinary circumstances to support plant life and evaporation on an ordinary cultivated plain. I know that a twelve-inch rainfall is about necessary for a crop, yet if that twelve-inch rainfall came at the right time, when it would be best needed, why, probably a great deal less would answer. I cannot say that is is estimated that a twelve-inch rainfall is about the proper rainfall for the support of crops in a cultivated valley in southern California but I think it would be about true. I don't know that the rain which falls on the San Fernando basin west and south of the center is consumed practically in sustaining plant life and by the ordinary loss of evaporation. I have been in the San Fernando valley nearly to the center immediately after a good two-inch rain and not one particle of water be upon the surface. It

had all sunk away. That formation is very largely disintegrated sandstone, but there is granite mixed with it. There is more sandstone than granite, but any one that has passed over the San Fernando valley knows that there is something of a loam at the surface. That is called number-one farming land
643 and is land that will take up rain, and I think a large part of the rain would go too low to be reached by vegetation and become a part of the underground water. After it gets below the surface the ground is saturated and it works its own way on down, the water. Then it is drawn back, a portion of it, through the operations of plant life. That is a good grain-producing section, and there is an immense amount of grain produced there. And the production of grain successfully in southern California does not depend entirely upon the rainfall. It depends a great deal upon the cultivation and preparation of the ground and the soil. The more you cultivate it the better it retains moisture. The more the valley is cultivated the more moisture there seems to be there. Between Los Angeles and Santa Monica the formation after you get from two to six feet below the surface has a hard pan, and the water would sink to that and then run off; and that is one thing that makes some of these cienegas between here and Santa Monica. I don't know the nature of it south towards San Pedro.

Q. Suppose the San Fernando basin did not have the mountain sheds around it; would the Los Angeles river exist, in your opinion?

Defendants objected to the question as immaterial, the court overruled the objection, the defendants excepted.

The witness answered: It may not give enough of water to give the amount of flow that is in the Los Angeles river at the present time. It would not. But there would be water. You could obtain water by lowering the Los Angeles river. You could dig a trench and get it.

Q. Now, in your opinion, if there was no mountain shed to the basin, but simply the basin itself to furnish the water supply, would there be any water supply there other than the supply necessary for its own uses?

644 The defendants objected to the question on the ground that it was irrelevant, immaterial and incompetent.

The COURT: It is proper cross-examination.

To which ruling of the court the defendants excepted.

The witness answered: That would depend entirely upon the rainfall.

By the COURT:

Q. Well, with the same amount of rainfall would there be any stream of water issuing from that basin.

The defendants objected to the question of the court on the same grounds.

The witness answered: That is a pretty hard question that I don't

care to answer. There would be a drainage from the valley, if there was more than the plant life needed, and if there was no mountain watershed there and only the basin, that is, I believe there would be more than the plant life and the domestic necessities of the valley would need. I don't believe it would be available to make a water supply for a city or for anybody outside the uses of the valley itself. I say that our investigations gave a maximum velocity of the underground flow at about ten feet per hour. That was figured on 17 miles per annum. The other experiments showed fourteen miles per year, something like 7 feet per hour. If I made an experiment at one place and found ten feet an hour, and at another and found six and one-half or seven feet per hour if I were going to make an estimate on the whole as far as I know, I would strike an average between the two for a mean flow, which would make somewhere in the vicinity of eight or eight and one-half feet. At that distance below the surface. Further down I think the flow would be faster. There would be a greater pressure. I have no idea how fast. I don't think there is any place there where it is flowing as fast as the river. I am not sure but what there may be some of that
645 kind of streams under there. But the indications don't show it as far as we have compared the wells, and I don't believe there are any. I think it runs in about the same general mass of water running through the sand and boulders, and that the water is one solid body except possibly where these clay pockets are. I have said a good many times that there is an open cut here on the river and the river is to the north of it and the water plane between the cut and the river was higher than either the cut or the river.

Q. Do you believe the water in the land between the cut and the river will remain higher than the river and the land?

A. It has remained so for something over a month.

Q. And do you think that it will stay so all the time?

A. Yes sir, as long as the amount of water is supplied at the upper end of the watershed. The cut and the river are about 250 feet apart at the nearest point, and in that strip between them the water is standing above both the cut and the river. Under ordinary circumstances that water would drop out through the sides and drain down and come down to the level, and it does not do that here because the upward pressure keeps up the supply, and keeps this water flowing steadily down that 300-foot strip between the two, yet, at the same time, I am not certain upon that. I know the water is there, that it stands higher between the cut and the river, and I know that the water drains both from the river and the cut from this column or mass of water; and I know the water is going to keep right on following down through parallel with the two; and I don't know that it must have a pretty well-defined flow and pretty well-defined channels to run in, in order to flow down that 300-foot strip, parallel with the two.

Q. Mus-n't it have a well-defined flow and pretty well-defined channels to keep it from falling off either way into that cut or river?

646 A. The resistance of the sand and gravel will keep it from flowing into the river or cut.

Q. If it has not a well-defined flow in a well-defined direction, wouldn't it flow out the south side or north side, just as easily as it flows east?

A. It is percolating both to the north and to the cut and also to the east where it crossed it; and I have testified in my opinion it is never going to come down to the level of the two. It has not for a month and a half. The upward pressure from below keeps it up. It is running off as fast as the cut will draw it. At the same time we don't lower it. The grade of the water is east. If it was simply a body of water, solid mass, it would fall down these two lower places as easily as go east, but being mixed with sand and gravel it will not and does not. There is less resistance, as far as that particular point is concerned, towards the river and cut than it is to the south. The resistance to the south and the north, so far as that particular body of water is concerned, is less than to the east.

Q. Then, if it has less resistance, if there is less resistance towards the ditch and towards the river, why don't it go out?

A. It runs just as fast as the material will allow it to now, but I don't think it will ever get into them, and I think it will be higher always. I could not say where the line showing the water plane on profile "A A" would run if extended toward the city ditch. It would run at about the same inclination that it has here, until it gets to the ditch. Then it might go to the ditch, quite likely it would, but as far as my experience is concerned we saw that there was no change in this water plane the last two hundred feet. We didn't think it necessary to go any further than the wells. We have drawn the water plane arbitrarily from the top of the water in one well to the top of the water in another. We could not just as certainly have drawn the water plane up to the bottom of the ditch from the last well.

647 It would not be correct. Investigations in other places show that it continues on at about the same level, and when we get out a certain distance then the water plane seems to go towards the water in the ditch. I testified there are trees five feet in diameter on this land. I don't know which is the oldest, the trees or the river. I think the river is. I think the river deposited the material, or a great portion, of which the benches are made that the trees are growing on, and I believe it was deposited from the Cahuenga range of hills. All of the land that we now see. Some of the under portions might not have been. The first deposit was probably made by the water brought from the San Fernando basin, and when once started then other deposits came to it from the river and the Cahuenga hills above. There are places in the river where the current is much swifter than in other places, caused by the difference in the grade. Where the grade is steeper or the river swifter or slower, I don't know how that I can presume that the same conditions exist with reference to the underflow. The same principle would hold good. As a general proposition, it would seem to be so, but it is not necessarily so. The water under ground would depend

on the material. If the material were the same and the grade were the same, the underflow would follow the same general rule. I believe it would be a feasible engineering proposition to run tunnels under the San Fernando water basin, parallel to the general direction of this land, north of it, and get water; toward the lower portion especially. Say two or three hundred yards north of it, to a half a mile north or a mile. Of course, it would be owing to the amount of excavation that you would have to make. Beginning at the low place in the river and running north or northwesterly, the average grade is about 52 feet to the mile, and beginning down below this land some distance a tunnel could
648 be run up to the land and when you got opposite to it be at a considerable depth. Fifty feet to a hundred feet. Whether that would be a practicable project I wouldn't like to say. Aside from the matter of expense it would be an engineering possibility. Whether it would cost more than it would be worth I would not care to state without investigation. If such tunnels were run they might take a portion of the 3,000 inches of water that could be gotten on this land. If there were a cross-section excavated above this land so as to cut off not only the water off the land, or take the water away from the land and reduce the water plane on the land so low that this development would not take any water from it. It would not be a business proposition or practicable to run a tunnel that would take the water away from this land entirely. Every excavation you put in and draw water, takes so much water away from the water plane, and you lower it for a slight distance from your excavations, and that water is going to come from somewhere to fill it up; and every time you go around and put a cut in and take out 500 inches, as the Pirtle people have, you have taken 500 inches constant flow out of that water plane. You can take out enough on that plane, or in the land adjoining, that is supplied to it from the land above, and that would limit the extent of development on the lower portion of the land, before you lowered the water plane so that the Los Angeles river would disappear.

Q. That wouldn't keep it always, though, would it; this is not what you would call an unlimited supply?

A. As long as the rain falls upon the watershed from above it would keep supplying a certain quantity of water to the lower portion of the basin. In my opinion if three or four dry years should follow each other and such cuts and developments were made about here, the water flowing from this development and also from the
649 Los Angeles river would be decreased. I could not say how much. It is within the range of possibilities that with no rain falling for a number of years they would wipe it out. When I refer to the San Fernando basin I mean the valley of the San Fernando. That is about 12 or 13 miles north and south and from this land west about 18 or 19 miles, east and west. If the water under ground in this San Fernando basin is flowing at the rate of 17 miles per year, I should think that the rainfall would run out in a year.

Q. You testified the first place you struck it under this land it was flowing at the rate of 17 miles per year.

A. I said that the investigations that we made at the upper cut showed the water we had measured was passing through an area that would give us a result that would equal 17 miles a year.

Q. Now, take all that water under there as flowing at the rate of 17 miles per year, and you should exhaust it all in one year, and the next year was a dry year, there wouldn't be any water in the country at all there, would there?

A. That would require a little calculation. I would say this, that to lower the water plane of the San Fernando 10 feet would give you a yearly flow of about 35,000 inches. It certainly can't be true that all this water in this valley is flowing at the rate of 17 miles a year. Simply that the water in the San Fernando valley is coming down over a wide portion of the valley; and it is, as you might term it, fingers, or spread out, and is running through this sand and gravel. When it strikes the Cahuenga range of hills, there is an extra pressure there. By "fingers" I mean it is spread out over the valley and is not running in a body. I don't mean in fingers or streams.

Q. Well, what did you say it for if you didn't mean it? That is just what you mean, isn't it; spread out just like fingers?

A. No, it is not spread out——

Q. What did you mean?

A. For instance, in the term of fingers. But, at the same time it is percolating or coming down in sheets over the entire valley, and, when it strikes the Cahuenga foot-hills, there is an extra pressure that raises the water from 10 to 15 feet.

Q. That is all right. We agree with you on that. What did you mean when you used the term "it came down, spread out like fingers"?

A. Well, I did not mean——

Q. You did not mean to say that?

A. That it would be flowing in streams, no sir. I meant that it was spread out and that it was not in such a volume, as far as depth was concerned, in the valley proper as in the lower edge of the basin. There are no indications, as far as the well that I have observed that it runs in better-defined streams in one place than it does in another. If the material is coarser it runs faster in some places than in others, and the materials are coarser in certain portions of the valley, and the water moves faster than it does where the material is coarse. I don't admit that there are any streams as far as I know. There are places where there are boulders mixed with gravel, and not this finer sand, and the water certainly runs or moves with a faster velocity than it does where it is finer. As you would lower the water plane, it would have a tendency to decrease the amount of water in the Los Angeles river, provided you didn't lower this back water that is caused by this Cahuenga range of hills. If you were to take out 3,000 inches on this land it does not necessarily follow that you would lower that back water. You would take out 3,000 inches of

the amount of water that is being supplied to that portion of the land, and that would not have any particular effect on anything outside of the drainage of that 3,000 inches. To develop
651 3,000 inches, there, the plan as outlined by the city is a first-rate one. That will take out that much. Where it passes under the river, as outlined by the city, it would affect the flow of the river, but it would not affect the plane through the main plane of the San Fernando water, simply because you can't take out any more at that point than is delivered to it from the watershed above, and when delivered from the watershed above the void which is left is the void right where you take it from.

Q. Yes sir, and it has got to be filled from somewhere?

A. It is filled, being constantly supplied from above, and that does not necessarily lower the plane all the time, only as far as the drainage area of the cut is concerned. It would not keep right on running forever if there were no rains to supply it. It would gradually lower. There are other places pretty nearly as good to develop water as the Pirtle development, and chances for cuts to be run, but you might not develop any more water than is supplied to it. There is not as good chances for it to be supplied to other cuts as it is to be supplied to it, if you run in a number of cuts. You will decrease the amount of water in the different cuts, simply because you will have to divide the total amount of water that is delivered between the cuts. The flow in each of them will grow correspondingly less if you run in a great number, and the flow in the Los Angeles river will grow less in just the same way, if you run in cuts above. The Los Angeles river, in short, is simply a big cut in the water plane, just like these other cuts, only it is made by nature and these by shovels or scrapers.

If you lower the saturation plane, the water in the cuts would be lowered. If you made cuts and enough of them, you will lower the saturation plane in that back water caused by the Cahuenga range of hills, and if you lower the saturation plane you have low-
652 ered what the Los Angeles river depends on for its existence.

In answer to a question by the court, the witness said that if three thousand inches were taken out of this land in controversy, without affecting the river flow on the surface of the land, he could not state what effect it would have on the flow of the river down below. It is presumable that some of that water would run into the river below, but I could not state whether it would or not. If you lower the saturated plane in the San Fernando valley you will lower the water flowing in the river and cuts, wherever you have made them. If you take out 3,000 inches of water on this land and water above it at the Pirtle cut, as is being taken out, I don't believe that the immediate effect upon the river will be felt further down between this land and the city limits.

I have testified in reference to this tract that the water rises from the bottom, but I can say further that after you pass this tract and the eastern end of the Cahuenga range, the most of the water comes into the river from the eastern side, the Verdugo side. It is a fact

that this stream is supplied and increasing constantly in flow from underground flow, for a distance below this tract as far as Tropico, and mostly from the eastern side of the river. Tropico is three or four miles further down the river below this tract. I have testified that the water which flows in the Los Angeles river through this land is fed by an upward pressure of the underground water. I have made no investigations of the conditions of affairs further down, and as far as my personal examination is concerned could not testify that the river below is fed from underground water. The material from this tract down to the city is about the same, I think, as on this tract. There is another watershed, the Verdugo, comes into the Los Angeles river and may change the conditions. The Ver-
653 dugo watershed comes into the Los Angeles river above Tropico. The character of the valley below this tract to the city of Los Angeles, as far as the surface indications go, is about the same formation as on this land. The Los Angeles river seems to be increasing below, but mostly from the water from the East Side, after you pass the point of this hill. I haven't observed closely as to whether it comes in from the under side very largely. It may, as I think it would, to a certain extent. Yet I know the plane of the water flattens out and is not as steep at Tropico as it is higher up. The water that flows in this land, or some of it, may or may not come to the surface lower down. I don't know. If the plane of the water at any point was flatter, or a steeper grade than the grade of the river it would not. It is presumable that some of this underground flow here goes to the surface lower down. If you should take out water above that would get out below, certainly you would not have it below. At Tropico I have a cross-section; part of the way across the outlet. The inclination of the water level is flatter than it is opposite this land. The stream on the surface flows faster on a steep grade than it does on the flatter, and the underground flow, if the material is the same, could be judged as increasing or decreasing as the surface did with the change in the grade. The principle ought to hold good, except that there may be certain conditions that will be an exception. I don't know of any under this land that makes it an exception. I don't know that the underground flow at Tropico is slower than on this land, nor that the surface flow of the river is slower. I believe the grade is steeper after you turn the point of the hill coming on down the eastern point of the Cahuenga range of hills. I think it is about 16 to 18 feet to the mile. The grade of the river through this tract is 14.7 feet per mile. I don't know the grade at the city limits. I think
654 that it continued about 16 to 18 feet per mile through the city, and I think up east and north above the city limits in this land it is about 16 or 18 feet. I take the surface of the ground at this cross-section at Tropico, and made some borings. The valley at Tropico is about a mile and a quarter or a mile and a half in width. I made three borings to ascertain the elevation of the water in the soil. I didn't strike bed rock in any of my borings there. The height of the surface of the ground from the water plane where the first was bored is 18 feet, and the second about 15 and the depth

from the surface of the ground to the water plane where the first or old well that I got my information from, is about 48 feet. The elevation of the river at a point where it leaves this tract is about 450 feet, and where it enters it about 493 feet. The fall in a straight line is about 43 feet. The distance on a line is 8,700 feet. The fall is 25 feet to the mile. The elevation at the head of the city ditch is 475 feet, at the lower cut about 450 feet. The fall between the city ditch from the east side of the little mesa and the lower cut is 25 feet. The water must run through that portion of the mesa there. Where we put our cut there is a low moist spot. No more than any other portion to my mind, except at the upper end where there has been flags and tules that I know of, since 1891. At the upper end of the cut there is a little cienega or seems to be where there has been flags and tules. The flags and tules are there because of the water, and the water that is there follows the general principle that underlies the water at the base of the hills. There is an upward pressure and it forces the water nearer to the surface than it does lower down. I don't know of the surface flow of the river running under that mesa. There would be less resistance flowing on the surface of the ground than running under ground under that mesa, with that fall. Where the distance is not over 2,000
655 feet greater around than it would be through. The grade is about the average grade of the river. From my observation there is no stronger flow of water under that mesa than at other places upon the land. It is a fact that the only place where we find that the water rises in the well perceptibly and with the strong pressure, was under that mesa. I know that where the deep well was bored at that point the water rises about six inches in the well, but I don't know how suddenly. But if the water in that well rose six inches quite suddenly, when we reached a certain strata I would attribute it to the fact that the resistance was less in raising the water than it was in passing through the ground below the well. The resistance which the underflow met was great enough to raise the water six or eight inches whatever it may be. There is a pressure in artesian wells, and there is a pressure that forces the water to the surface of the ground, and this would be the same nature as an artesian well, only it doesn't come to the surface. I would call it an artesian rise. I have testified that the water flowing in the city ditch did not, in my opinion, have any effect upon the water in our cut to amount to anything. I believe I selected that place for putting that cut in. My object was that it was at the lower end of the tract. We wanted to make the development at the lower end, and also near the upper, and we had no other object in view in selecting that particular place. We didn't think that would be the best place for any particular reasons. There were business reasons which were that in making the development at that point a future development could be carried on, and the work which was already done would not be lost. It was not because that place was especially best for producing the most water. I believe I can locate a cut upon other portions of the land that would produce about as much water.

The other was selected because we wanted to get a cut at both
656 the upper and the lower ends. We didn't make any at the tract between them. The other cut ran along by the side of the Tejunga creek, and the water stands higher between the Tejunga creek and the cut than the water in either the cut or the creek. I don't think that the water has any effect upon the water in the creek, and the water in the creek has no effect upon the cut. The Tejunga and cut is located in the low land of the main Tejunga wash, and by locating it there with less work we could get lower below the water plane. The fact that the Tejunja creek flows there and that wash is there, indicated to my mind that there was a better opportunity for getting an underground flow more of it with the least amount of work. I can locate a cut east of the Tejunga that I am satisfied will give as great an amount or probably greater than in the Tejunga wash. That is about a quarter of a mile above the upper cut on this tract of land. I think it will do that simply because there are indications showing that. The ground there is thoroughly saturated with water, and the water is percolating and stands higher several feet than the water in the river. There are places where I think I could get more water in other places, owing to the material that we are going through. It is about two miles and a half across that plain opposite this land at the nearest point to the Verdugo mountains. I can't say that the water plane extends clear across there, but I know at Burbank they have water in the wells. That is about 2 miles or two and a quarter of this land and north of it. At the Burbank station, or a little below, water was struck at 20 feet below the surface. Burbank is about where the foot of the slope unites with the level of the contour of the valley. I can't say that the water plane extends clear across there, but I presume it does. I don't know how deep it is to bed rock across there. We found
657 bed rock in the first well that we bored, and that was within 1,000 feet of the Cahuenga range of hills. We struck hard rock. I doubt it was bed rock. The well-borer was of the opinion that it was. That was at a depth of about 195 feet or 200 feet. I know of no other point across there where they have struck bed rock. I should think it was about 200 feet to bed rock. I cannot say whether that is all saturated or not. I think it is from the wells we have bored, but I could not say. The grade may change that. Supposing 123 feet to be the depth of the cross-section, the area of a cross-section across the valley through between the boring and the Cahuenga mountains, would be 1,297,000 square feet. I am taking for the width two miles. There is a narrow point where it is about two miles and a half to where the mountain strikes the slope of the valley. One-third of that area, in my opinion, from the investigations we made, is water, and you could get 433,000 cubic feet of water for one-third of that cross-section.

Q. That is moving at the rate of eight feet per hour?

A. I don't know.

Q. Well, as far as your investigations have carried you, it is moving at the rate of eight feet per hour?

A. As I say, the investigations we made at the upper cut, it was moving at the rate of about eight feet an hour.

That would make somewhere about 50,000 inches constant flow under ground.

Q. Well, there must be something rotten in those figures, isn't there, somewhere?

A. Well, there may be, and it is owing to the material it is passing through; and then there is another condition: that the cross-section may not be as wide. We are taking a condition that may not exist.

Q. And it is quite possible that these various figures that you have made and various statements or conclusions that you have arrived at, have been based upon facts which do not exist, isn't it?

A. The rate of flow that we obtained when we obtained the
658 rate of 17 miles per year, was made from actual measurements in that cross-section drain, and there could be no perceptible mistake in reference to that. It is evident to my mind that there is not 50,000 inches of water flowing under there.

Q. Well, then there has been something wrong about these figures, hasn't there? Either the voids are not so great or the bed rock isn't so deep, or this water isn't flowing alike over the whole ground.

A. In making this calculation, I have taken a cross-section as suggested by yourself. I know nothing about the cross-section. I have said that at the first well we put down the bed rock was about 200 feet down at one point, and that the borings of the San Fernando valley shows that further out in the valley it would be deeper. Yet at the same time there may be a dam arise in the bed rock across that outlet. I have known of it existing in water basins. I know nothing about what is under ground at this point. As we go down closer to the side the hills project nearer together. That would tend to contract the water and raise it to the surface, if there were no other way for it to get away below. I don't know anything about the amount of water in the river at present, from the city limits to the Arroyo Seco bridge. I made no measurements of that. I can't say that from the Arroyo Seco bridge up towards this land the flow is always about the same. It seems to be as far as personal view is concerned. There is nothing to indicate to my mind that a different state of facts exists anywhere under this cross-section from what exists here, Only, as I say, the hills project nearer and the formation of the hills contains rocks. I have never given any thought as to whether this cross-section which you have taken of about two miles wide and 123 feet deep, as a fair cross-section for that water-bearing land. I don't care about the cross-section, so far as I was employed to do upon that land. I have testified of the character that the character and things of the
659 material seemed to be about the same. That there is a water plane there, as shown by the borings. I don't know why the cross-section given by you isn't a fair one of the water-bearing land, but it may be less or more. The velocity may be less or more. There is several conditions entering into the movement of the water under the ground. There may not be as much water in that cross-

section as you think there is; not the 40,000. It may be there is less of the water in the run-off than I think there is, but I believe there is more than 19,000 inches.

Q. Why do you believe that?

A. Simply the manner of obtaining that in the calculation gives us less upon the drier years and less upon the wet years. We only have a run-off about once every five years. The run-off from Tejunga and the higher mountains. Storm water run-off.

Q. Well, I didn't mean that. In speaking of the water which is discharged out of this neck, what do you call run-off?

A. In the run-off, in making this estimate I included in the run-off the amount that was flowing in the Los Angeles river and storm water.

Q. In what category do you include plant life and evaporation?

A. In evaporation. I can't say what percentage of this watershed goes into plant life and evaporation. I made an estimate of fifty-five and one-half per cent. for the amount of run-off and evaporation. Yet, I will say, that in making that average, during years of average rainfall, there is no run-off from the mountains. I figure that 45 per cent. of the total shed runs under ground. That that was the amount of water that came down from the watershed and entered into the ground of the San Fernando valley, and which amounts to, I believe, 19,000 inches, and I do not believe that there are 50,000 inches running under this ground. The estimate we made was 19,000 inches. I believe it should be somewhat more.

660 How much more I don't know. I thing the estimate is too low, as I think it is about once in five years we have this storm run-off. The other four years we have no run-off from the high mountains. That all sinks into the ground. Yet we have allowed our portion of that as the amount of run-off. How much is running under ground is a matter to a certain extent of theory. When I say I believe there is more than 19,000 inches, I simply do that to illustrate that I believe 19,000 inches is a conservative estimate, and I believe of that about 50 per cent. comes down through this tract of land, and that there is flowing through this tract, under ground, about 9,000 inches. I do not think that there is 9,000 inches at this cross-section, where the first well was bored, flowing under ground. It is not necessary that it should, to have that amount of water come around. The percolation of water underneath was swerved the same as water upon the surface. It is not necessary that 9,000 inches should enter at the upper and continue through the land to the lower end. I could not say where a cross-section upon that land would show 9,000 inches, but owing to the location of the tract and the position it occupies and elevation, I have made an estimate of 9,000, or half of 19,000, as controlled by this land. Which may not enter at the westerly end and pass through at the easterly end. It may strike it at certain portions and then be deflected by obstructions. This tract of land, at the widest place, is about 2,600 feet wide. That takes up to the foot of the mountains. The water plane exists all the way across that 2,600 feet, as far as we bored the wells.

Q. If you got a constant flow of 50,000 inches in two miles, in a half mile you would get a constant flow of 12,500 inches wouldn't you?

A. To the depth that you suggest, it would be that——

661 Q. Well, now, do you believe that there is 12,500 inches of water flowing under there, constant flow of water?

A. I stated I believed that in my estimation there was about 50 per cent. of the 19,000 inches. I base that particularly upon the location of the land, in reference to the contour of the country. If the crop of this watershed was only 15,000 or 10,000 inches, should still think that 50 per cent. of it would flow through this land. I don't see any reason why the proportion should change.

Q. How much water which runs under this land, of the 9,000 inches, is available?

A. We have estimated that starting at the elevation of 450 feet, we could develop 3,000 inches of water. I consider that about 3,000 inches is available, no matter how much is flowing underneath. It don't make any difference how much is flowing underneath, except to a certain extent, but as far as 9,000 or 8,000 or 7,000 inches is concerned, it would make no difference. If there wasn't 2,500 inches you could not develop 3,000. I based my theory that 3,000 inches is available, by taking the amount of water that we have developed in the cuts that we have already made, and upon the lower cut, which shows a lower rate of development than the upper cut. We knew and could calculate the amount of cubical contents that was drained by the lower cut. Extending that cut up westerly to the end of the tract, that would drain a certain other amount of cubical contents, that would give us the 3,000 inches of water, and that would only drain a limited amount of land on each side of the cut; about 700 feet at the upper; at the lower about 400. If we were to make another cut parallel of the same general character, we would develop as long as the water would be brought up from below. If cuts were made, paralleling each other, 1,500 feet apart, right straight through this water plane, if the conditions were the same, would produce water in the same manner. That

is, if the upward pressure is the same. That is what

662 brings the water to the surface, and is what causes the river.

The upper pressure combined with the pe-colating water from the sides. The water in the river is two or three feet lower than the water upon each side. There is water and a saturated plane, all through there, and if you go into it with a cut, just as you go into it with the cut here, you will develop water, but you will not develop any more water than in the Pomeroy and Hooker tract, at any time. The Pirtle tract is not the same as this. There is not so much upward pressure. Their cut is at the upper end about 20 or 25 feet. You could not go in there just in the same way as here, because you would go below the water plane. I say that along here and at the surface and within 32 feet of the surface, is water which may be taken out to the amount of three times the flow of the river; that is, of the flow of the river at the upper end, and that the press-

ure is so strong that it is forcing it up continually all the time, so that the Los Angeles river is not drained over 150 feet on each side of it, and the standing up of the water in the river is due to the upward pressure upon the lower side. That is not exclusively the cause of the Los Angeles river. The water percolating in from the sides upon the north from the natural drainage of the San Fernando valley and from the south by the percolation of the water that has been raised by this upward pressure. The water is shoved out from those sides by the pressure on the south side of it. To a certain extent it may be on the north side, but not entirely.

Q. What would be the result then, of going into the ground and taking out 3,000 inches. Wouldn't it be to take off that pressure.

A. But we determine before we go about how far we can go, not to take off that pressure. By using the information that we have obtained by making those cuts, which shows the drainage curves, and we
663 can develop the 3,000 inches, and not affect this pressure. By determining or locating the tunnel at the proper distance from the river, and because there is a raise of water below, and there is a change in the grade of the water, caused by the obstruction of the Cahuenga hills, and that causes the water to rise; forces it up and causes the river, the same as any angle in a ditch or any obstruction in the ditch will raise the water.

Q. Then you mean to tell me that you can go down under this and take out 3,000 inches, which is twice or three times as much as there is in the river on the surface and still not relieve this upward pressure, so as to let the water in there?

A. As you—it is the same as an artesian well. The lower you can take a cut, the—the lower you get the water—or pipe, the more water you will get. The same in those cuts. And you will not, if you have your tunnel located at the proper distance from the river, you will not locate—or interfere with the water of the river.

In artesian wells the lower one will decrease from the upper one. And if the lower one is of sufficient capacity to carry the water off, it will dry up the upper one. Where two wells are close together, and it is open and porous and a connection between the two wells, the lower will draw the water from the higher. Where there is a resistance between the two wells, if they are located some distance apart, it will not. The reason the lower one dries the other well is because it takes the pressure off that forces the water out of the other. If the cross-section two miles wide and 123 feet deep, furnished 50,000 inches, a cross-section of a half a mile, the same depth, will furnish 12,500 inches, under the same conditions.

Q. Which would leave 50 per cent. of the water to run through the other three-quarters of the cross-section, the cross-section being over two miles, wouldn't it?

664 A. Well I simply state this; that I consider those your calculations. My estimate is that about 50 per cent. of the 19,000 inches passes through that land. I don't know that the other 50 per cent. has got a cross-section to pass through three times as big as this. As far as personal knowledge is concerned to the extent of boring of some wells northwest—a little north or north-

west of this land. I don't believe it is reasonable or necessary that all the water does or could go through this tract. It passes through between the Cahuenga and Verdugo. North of this land, but the cross-section will not be three times as large as this. We have no borings from the Verdugo hills, as far as I know, down to the railroad, and take it from the railroad on down to this point of the mountain, will not be over a mile. I believe that most of the water of the San Fernando basin goes through this gap, between the two mountains. Whatever the extent of that cross-section is, I don't know, but I should think it is in the neighborhood of a mile and a half or two miles; it is not two miles and a half. Two miles and a half takes it up to the foot of the mountain. And if 50 per cent. goes through this land, as I believe it does, the other three-quarters must go through there, and the water which is flowing through this land must be flowing faster than it is on the land at the north. I have never seen any tables laying down general rules for estimating the velocity of underground flow. Have obtained all the information I could, but have never seen any rule that is reliable upon the subject of underground water. Have read the statements and experiments of eminent engineers to a certain extent.

Q. And what do they, as a general thing, estimate the flow of underground water in sand, and gravel and boulders?

665 Counsel for the defendants objected to the question upon the ground that it was incompetent, irrelevant and immaterial. The court overruled the objection and the defendants excepted.

The witness answered: From four to eighteen or twenty miles per year.

Q. Have you read any estimates from experiments made by prominent engineers as to the rate of flow in the same character of material that this is?

Counsel for defendants objected to the question upon the same grounds; the court overruled the objection and the defendants excepted.

The witness answered: I have read a report of Mr. Manuel in reference to the percolation of water. He is an engineer of southern California and made a report for Mr. Spillman. I have not determined or tried to determine the velocity of the flow of water under this land. As far as the velocity upon the surface at the upper of the cuts is concerned, that is established and the velocity of the stream. But I have not established to my own satisfaction the extent of the velocity of the water under this land, away from where we can observe it. I cannot say that I have any opinion as to the velocity of the waters under the land north of here. I have observed the variations of the flow in the Los Angeles river, and believe that it is about eight or ten miles per year, across the San Fernando valley, and I think it runs faster under this land. From the figures that I have made, it must run under this land three or four times as fast as the water north of it for the same depth. If it is

deeper, it need not go very much faster, but it certainly moves faster. I said this morning the deeper the underground flow was, the faster it went. That is from pressure, and I believe is what causes the underground flow to run faster.

Q. What kind of pressure?

A. The back water; and it may be to a certain extent a
666 little more open, and I think it is. The water under this ground gets its pressure from the hydraulic pressure above, that is created by the fall. And I believe the water will and does move faster below the surface of the land that it does upon the surface in the fine material. It is under great pressure. The hydraulic grade line is something different.

Redirect examination:

Q. Mr. Friel, you say the deeper you go the faster you think the water moves. Is that correct?

A. Water under the ground, I believe it to be the case. Where the material is finer at the surface and gets somewhat coarser the sand and gravel and boulders as you go deeper, it would move faster through that material, and along the grade line. I have said that the water goes down from the San Fernando valley until it reaches the base of this mountain and strikes the Cahuenga range, and meets with a resistance by which it is raised nearer to the surface. That is what I mean by the under pressure; and you see the effects of it by the bubbling up in these cuts and in the river.

Q. In what direction do you imagine that the movement is faster at the base of these hills when the water reaches there?

A. It moves faster eastwardly along the grade of the bed rock.

Q. And why does it come up?

A. Simply because it is obstructed by the Cahuenga range of hills. The flow southerly.

Q. If it can move eastwardly more rapidly than it can come to the surface, why does it come to the surface?

A. There is an obstruction there.

By the COURT:

Q. Then it won't move so fast?

A. And there is, as you say, a greater volume.

Q. It has to move through a smaller space, too, hasn't it, to go through a smaller hole, than it goes in?

A. Well, in that case I believe so; yes, sir.

Q. Now, I believe you have already testified that the effect
667 of this resistance of the mountains is to set the water back. Can you determine for what distance?

A. By our profiles, yes, sir.

Q. How far?

Mr. DUNN: Objected to as not redirect examination.

The COURT: He testified this morning 2,000 feet.

By Mr. CHAPMAN:

Q. Is the movement of that back water faster than it is flowing off through the country, or down the San Fernando river?

A. The investigations we have made show that that moves about 17 miles per year. Those investigations were made right at the cut, and within the range of the influence of the cut. I believe the velocity was somewhat accelerated at the cut. The cut at the eastern end is located about seventy feet north and parallel with the proposed cut and tunnel of the city. At the upper end it is located north of the tunnel as proposed by the city. The mouth is about 100 feet north. The cut runs in a northwesterly direction. The cuts that we have made and the tunnel proposed by the city are within the influence of the back water from the Cahuenga range. That back water extends at the lower points about fifteen or seventeen hundred feet; at the upper end I could not say. There was one well dug by us that was 195 or 200 feet deep. Two other wells were bored to a depth of about 130 feet. Two or three others about fifty feet. We didn't reach bed rock in any of them, I think. Reached this impervious strata only in the first one and that was at about 130 feet. At the other deep well I think it was about 131 feet in depth. There was no water in the well below 101 feet. The next deepest well was 119 feet, and I believe there was water to the bottom of the well. There was another well about 49 feet and water was found in that all the way after we came to the water-bearing strata. There were two wells 49 feet. Those other wells, we put down 200 feet were
668 shallow wells. In these wells we found places where the material was coarser gravel, sand and boulders; other places there would be sand entirely and small gravel; other places larger gravel. Some with clay where the water didn't run at all. The material found where we were measuring the velocity of the water was principally sand and a few gravel. No clay. I wouldn't rely upon the test of the velocity made in all these cuts as any criterion for the average velocity of the percolating waters in this San Fernando basin. The grade line from the northern part of the valley to the Cahuenga range, is about 41 feet to the mile. And the grade line which leads away from it is about 22 feet to the mile. This deepest well that was bored was about three-eights of a mile southeasterly from the Tejunga creek. That creek flows about 200 inches of water, surface flow, at the upper end of the San Fernando valley, about two miles above its mouth. That is about the average summer flow. The flow of that stream is not continuous to the Los Angeles river all the time. It does not run over a mile and a half or two miles below that point. We made no tests of the depth it would be necessary to put the submerged dam to reach the bed rock across the Tejunga creek. Not to any great extent. Not over about ten or twelve feet below the surface. I think it would be practicable to put a submerged dam there, but somewhat expensive. As a business proposition I would rather run in a cut, or tunnel in preference to a submerged dam.

The cienega spoken of is located near the upper end of the lower

cut. The mouth of the Tejunga at the mountains, where it empties into the river on this tract, is about a mile and a quarter west.

Sandstone is more impervious to water than granite, when combined with a certain cement that seems to be connected with it. Yet sandstone will absorb 25 per cent. of its bulk in water. Granite will not absorb that large an amount. It
669 takes this cement to render the sandrock more impervious than granite. The climatic conditions in San Fernando valley during a rain is that the winds are brisk, and during a rainy season from the south. The rain that I spoke of falling in the summer time when I was there, was in July, and was accompanied by wind and thunder. I have no other means of knowing that the rainfall is less in the San Fernando valley at the two places that I spoke of, than it is in the city of Los Angeles, except what information was given me. The explanation of the reason for the phenomena that I have been giving, may be simply applied to a case that don't exist at all.

Q. I believe you stated that your opinion was that the rains here in this section of the country came from the southeast?

A. The winds, I believe, are from the southeast. If I said that the rains came from the southeast, I meant that at the time of the rain storm, our general rains, the wind is from the southeast. I understand that our rains principally come from the north, and work their way down the coast. I know from my residence in this city, and as a matter of fact, no matter where they come from, that when we have a prolonged storm, they do commence in the north first, as a general thing. The general trend of the Pacific coast from San Francisco to Los Angeles is south-southeast. What I mean by saying that the water plane was affected by these cuts at a certain distance, is that it does not lower as far as any observation that we have made, to any extent upon the side of the cut.

Q. Well, within the line of that influence, would the effect be to drain the water out?

A. To drain the water from the cut upon the curved line and reaching to about, say when the depth of the cut is two feet or two feet and a half below the saturated surface, about forty feet upon each side of the cut; but I don't mean to say that the
670 distance to which the movement of the water would be affected, that the water would all be drained out. If the water now flowing in the cuts and which has been flowing ever since they were constructed, drained the sides to that extent, without being replenished, it would cease to flow. I know of no wells dug for any considerable depth in that section of the country, say 10, 40 or a hundred feet below the water plane, that did not pass through strata of a different material. On the profile upon which I was cross-examined by Mr. Dunn, entitled, "The profile of the outlet of the San Fernando valley, near Tropico, Los Angeles county, California;" that profile is at a distance of about a thousand feet north of Tropico and runs in an easterly and westerly direction across this stretch below the Rancho San Rafael, and it is below the Verdugo watershed. The

profile referred to was here introduced in evidence and marked "Defendants' Exhibit T," and made a part of this statement.

The well marked on the profile nearest the river is 35 feet in depth, and the depth of the water is 17 feet. The elevation of the surface above sea level is 387 feet. The second well is 22 feet in depth, and the depth of the water is 15 feet. The third well is 75 feet in depth, and the depth of the water 47 feet. I testified that the San Fernando valley was made by the wash from the mountains, in my opinion. I have been all through the mountains to the north of Tejunga and Pacoima. Have found seashells in the mountains. I know that in borings to the south of the city of Los Angeles the bark of trees has been brought up from a depth of 75 or a hundred feet. I know of one case at Redondo that we brought up pieces of a log about 100 feet below the level of the ocean. It would be very hard to tell how much of this Fernando basin has been made by the upheaval of these mountains and the depression of the other land correspondingly, and how much has been washed from the
671 hills. The elevation at the place where the Garnsey and Howell wells were sunk, is 816 feet above sea level. At that point the water was 150 feet below the surface; which made the elevation of the water 666 feet. The wells to the west of there at the home ranch, the elevation of the surface of the ground is 770 feet, and it was 100 feet to the water; the elevation of the water would — 670 feet. Think that the present plan of the proposed tunnel of Los Angeles city and the laterals, where it would run under the river, which it does at about three places, would have some effect to lower the surface of the Los Angeles river. The first place they cross would be about 20 feet below the river; the second about 25, and the third about 30. A tunnel could be so located as not to draw upon the water of the river. By changing the location, to a certain extent, and, where you pass under the river, or near the river, make it water-tight. By putting in bricking, cement work. Leaving the tunnel in the position it is proposed to construct it, it would not be necessary to build the brick or water-tight conduit, where it passes under the river, over 400 feet each side of the river to avoid drawing from the surface. That would probably increase the cost about 100 per cent. for that portion. The construction of that tunnel upon that plane, would not have any effect upon the water plane of the San Fernando valley. It would not lower it at all, nor in this tract of land, beyond a few feet of that curved line, because the water is supplied in such quantity below that it would supply the tunnel without draining from each side to any considerable extent. The water is found there to a depth of about 123 feet. The construction of a tunnel at a depth of 32 feet would take off a pressure that in pounds would be about 13 pounds to the square inch. That pressure would be the pressure from upwards downward. It would give you a greater quantity of water at the bottom of the cut, and that would
672 be by relieving the pressure overhead. It would not diminish the upward pressure at all. You would have to tap this water at the lower level, in order to relieve it from the upward pressure.

I made a computation of the contents of the cross-section, which Mr. Dunn was speaking of, across this valley, from the statement that he gave. I assumed it to be two miles wide, or 10,560 feet, and assumed the depth at 123 feet, and that gives the surface of such a cross-section in square feet.

Q. Then how could you determine the amount of cubic feet in that measure?

A. You would have to know about the velocity. If you wanted to obtain the miners' inches, you would have to know the velocity of the underflow. So that the computation is based entirely on that width and depth of the cross-section and a velocity of about 17 miles per annum, and one-third voids entirely across and the only information I have in regard to any of these factors is simply that which I testified to here before the jury. The sinking of the wells, the test of velocity and of those wells one extended to the depth of 123 feet and in one of them there was no water below 130 feet.

J. A. PIRTLE was called as a witness on behalf of the defendants, and, being duly sworn, testified as follows: Have lived in Los Angeles city nine years, and been engaged in the real-estate business and development of water propositions. Know what is known as the Pirtle development, and been in the real-estate business about 16 years, and dealt in water propositions for the last seven years in various parts of the State, mostly in Los Angeles county. Am acquainted with the values of water and lands in this section of the country. Have been for the last four or five years. Know the land in controversy. Know the elevation above the city of Los Angeles. The value of water by the inch, under a four-inch pressure, developed,
673 upon this land to the extent of anywhere from 500 to 3,000 inches, is and would have been in 1893, if you had 3,000 inches, a thousand dollars an inch; and there would not be any difference in the value if there were 2,000 or anything above 1,000. If the amount should fall as low as 500, I think it would be worth less. I would not value it over $500 an inch. Have been all over the tract of land. Was there last week. Been up there again yesterday. Was at the cuts of Messrs. Pomeroy and Hooker and examined them both. Saw the quantity of water running, saw how it made its appearance. The water comes in mostly from pressure from underneath and from the sides. Trickling in in small quantities, at any given place, but continuously from one end of the ditch to the other it is constantly flowing in. The amount of water flowing is greater at the lower end than the upper. At the head there is a very small quantity. The increase from the head to the mouth in the cuts is continual and gradual. Was along both sides of it. Was no places at which there was any considerable influx of water. There are some places where the quantity of water seeping in is a little greater than others, and that occurs all along the cut, the whole length. There is no particular place that has any marked distinction above another place. Know where the ditch used by the city is, with reference to the lower cut. It is about a hundred feet from the cut. The quantity of water seeping into this

cut, or finding its way through by any means, was not, at the time I saw it, affected by the presence of the proximity of this ditch, to any appreciable extent. There was no water in the ditch. There had not been for several days at the time I examined it. There was no water in the ditch at either time I saw the cut. I don't know how long it had been turned out, but judge from the amount of work that had been done on it, it must have been at least four or five days, the first time I saw it last week. I examined the cut again on the same
674 day and then I was up yesterday. I didn't notice whether the water was running in the ditch or not. Know where the upper cut is situated. That is some distance from the ditch. Above it to the northwest. It would not be possible for the flow of water in that cut to be affected in the least by the ditch. I didn't observe any difference between the quantity of water that was flowing into the upper cut and the mode in which it was coming in from the lower cut. Just the same in both. Am connected with the Pirtle development. I am the Pirtle from which it takes its name. I have been acquainted with it from its inception. We have a flume six feet wide, four feet deep and 5,200 feet long. A wooden flume laid in the ground. Where we quit work the bottom of the flume is 21 feet below the surface of the ground at the upper end. There is no bottom in the flume. There is developed in there a little over 600 inches flowing now. The water comes in underneath and from the sides into this cut. I don't suppose any one could tell where the greatest quantity comes from. It seems, as far as we could tell, it is the same on both sides. From my observations there is a greater quantity comes from the under-pressure by far. It bubbles up continuously from both sides. We measured the water in this cut every day while we were at work. At different places. The greatest quantity of water in our cut is at the lower end. We only measured it at one place lately. The weir just below the flume, and occasionally to test the weir we had a measurement in the flume, but we measured it night and day, for quite a number of days; and once a day all the time while we were at work. At the first time we measured it there was 60.6 inches flowing before we commenced work, in a little swale running off into the Laguna Company's ditch. We commenced work on September 10th. On the 13th we had 88 inches, including the 60.6;
September 16, in the morning, 90 inches; in the evening
675 92.40. The 17th, 93 inches a. m.; September 18, a. m., 87.60; September 19, a. m., 93 inches; p. m., 95.40; September 20, a. m., 95.40; p. m., 99.80; 21st, a. m., 99.80; p. m., 101.60; this a. m. and p. m. is at the time of commencing and quitting work; that is, about seven o'clock in the morning and at five o'clock in the evening. 23d, a. m., 102.40, p. m., 104.40; 24th, 105 in the morning, and p. m., 110; 25th, a. m., 107.60, p. m., 108.80; 26th, a. m., 106.40, p. m., 110.60; 27th, a. m., 109.40, p. m., 111.20; 28th, a. m., 111.20, p. m., 117.20; 30th, a. m., 120.80, p. m., 122.80. October 1st, a. m., 120.80, p. m., 125.80; 2nd, a. m., 126.40, p. m., 133.84; October 3, a. m., 140.20, p. m., 151.40; 4th, a. m., 150.70, p. m., 162; 5th, a. m., 159.60, p. m., 172.80; October 7th, p. m., 180; 8th, 190; 9th, 190;

10th, 200. Only one measurement a day after that; 11th, 234.80; 12th, 238.20; 14th, 241.60; 15th, 264.80; 16th, 268; 17th, 281; 18th, 296; 19th, 303; 21st, 299; 22nd, 306.80; 23rd, 303.20; 24th, 332; 25th, 346.80; 26th, 360; 28th, 392.40; 29th, 396.50; 31st, 396.50; November 1st, 418; 2nd, 418; 4th, 418; 5th, 433.50; 6th, 433.50; 7th, 452.50; 11th, 452.50; 12th, 452.50; 13th, the same; 14th, 455. November 14th was not the last work done on the tunnel, but the last daily measurement I have. The last work was done on December 10th; at that time there was 625 inches. Now about 610. During the time those measurements were kept, the excavation was being carried on from 30 to 60 feet a day, owing to the material, which is mostly sand, with occasionally a streak of gravel. Occasionally blue clay, in small quantities, very thin. Only three or four places that we struck clay. We have bored six wells in the vicinity. The first one is about five or six hundred feet from the end of the flume; that is, from the beginning of the flume, going north. The excavation runs north and west. Northwesterly direction. Bored that well 178 feet. Struck water at four feet; lost it at 51, and never struck it again. At 51 feet we passed through a
676 strata of blue clay; struck it at 48 feet. After passing through that I don't know what you would call the material, it was a substance that looked like brown mortar. A kind of cement. Not very hard, but contained no water. We went into that 127 feet and quit. The same material. We bored the other wells up near the end of the present flume at the northwest end. The first one is probably four or five hundred feet from the end of the flume, and then there are two beyond it. We struck water there at eight feet. The ground is at a greater elevation. That well is 47 feet. Found water all the way down. First 28 feet was principally sand. After that we struck gravel and stopped in the gravel. The next well is about 200 feet to the northwest of that one, and is 51 feet deep. The water is a little higher in that well than in the one below, the second one. The material was the same; we stopped in water. Material coarse sand and then ended in coarse gravel. The next well is about the end of the flume. Don't remember the depth of the well; all about the same. Ran from 51 to 57 feet. We struck gravel in that well about 12 feet from the surface. I think there was only one of the wells that we found any boulders in, and that was at about eight or nine feet in depth. Nothing with the boulders except gravel and sand interspersed with the gravel. The last well 200 or 250 feet in advance of the flume. The water stands five and one-half feet from the surface. I don't know how that compares with where we struck it in the first instance. I don't remember the first well. Wasn't there when it was done. The water rises in that about four feet and flows in the first well we put down. Not over the surface; it flows over the pipe, cut four feet below the top. We cut a trench there and a hole in the pipe. The water level in the pipe is about a foot higher than in the cut. In three other wells we have cut the pipe; two of them we haven't. The water rises
677 above the water in the cut in all of them. Considerably above. The water stands in one in which the pipe has not

been cut, five and one-half feet; the other 6 feet below the surface. The depth of the cut is 21 feet. The wells are 20 or 25 feet from the cut. That is, those that have been cut. The two that haven't been cut are about a hundred and 200 feet, respectively, from it. We have made one lateral in this main tunnel, on the property of Mr. Goucher. It starts on the west side of the main cut, and follows it about 50 or 75 feet from it, for about 400 feet, and it is one foot deeper than the main flume. There is about 70 inches of water in that lateral; and the presence of the lat-er has not affected the water in the main cut a bit, as far as we can see. It has been there since the first of October, or the last of September. The last work done on the lateral was some time in October. I don't think there is much difference in the cost of developing in the Pomeroy and Hooker tract and in the tract where we are developing. While we have to go deeper than they would, they would have to make more cuts, which would probably equalize the cost. It has cost us between five and six dollars a foot.

In all of our borings and excavations and observations in that section of the country, we have not found any water-courses beneath the soil. Wherever we bored or dug, we have found substantially the same conditions. In my real-estate transactions, have dealt both in city and country property. I know the Pomeroy and Hooker tract, and exclusive of its value for water that may be contained in it, its value for agricultural purposes, in my opinion, is about $25,000 as a whole. I don't think it is worth any more now than in June, 1893. The value I have estimated is for the 314-acre tract.

678 Cross-examination:

In placing the estimate of $25,000 upon that land, I base my estimate upon the fact that I went over the land pretty carefully and made an estimate of what I thought the land would be worth at a fair cash value, taking the different tracts or acreage or lots, whatever it may be, and estimating them each separately, and the total foots up $25,113. The items as I have it are, 30.42 acres of mesa land, $100 an acre. That is fine land for alfalfa and small fruit, and for berries it is unexcelled. Been there several years and has not been cultivated by anybody, and that I know of. The next item is 36 acres, $150. Good for the same purpose, but richer. Better soil. That has not been used, to my knowledge, although that has been cleared off. The next item, 30 acres, $75. Another class of land, 2 acres, $25 an acre; good for the same purpose, but some is better than others; 15 acres, at $150. The various items given by the witness, and footing up the amount stated. None of this tract has been used to my knowledge, for agricultural purposes. I testified that by far the greater quantity of water in my development came from the bottom. Have no means of ascertaining that as a fact, beyond the observation at the time; but that is my opinion, and I am satisfied that it is correct. I attribute it to the strata of blue clay which forces the water to the surface at that point. We struck the blue clay at about 35 feet, one strata, although we didn't find it to

be continuous. We struck in some places, and others did not. But about, running from 47 to 51 feet, as far as our excavations and well-go, we found that strata of blue clay from two and a half to three and a half feet in thickness, and below that we found no water.

We paralleled this main cut with the lateral, as an experiment to see whether one would draw from the other. We noticed
679 that the water seemed to come out from the bottom of the flume. As we would go along we would strike the little streams the size of your finger running from the side, and in a few days that would disappear and we would see it bubbling up from the bottom. So we concluded to put in this cross-cut, as we call it, side flume, as an experiment, to see whether that would draw the water from the bank between the two flumes and entirely shut it off. But we found that it did not. The water comes up from that in the bottom and runs in the side, from both ways; which proved to us clearly that the pressure was from underneath. We were three months making the development; had from 40 to 80 men. The number varied at different times, but I could not tell you when. We had a larger force of hands at work sometimes than we did at others. Material we went through about the same except the upper end is not so heavy; more sand; I account for the fact that on some days we had less water than we had the day before and on others had increased 30 or 40 inches in one day, in this way. Sometimes that increase was caused by striking a strata of gravel, as we went down and wherever we struck gravel, sometimes six inches, sometimes six feet wide or long, we got more or less water. And some days we went into this strata of blue clay, and in that we didn't get any water. And then for some days we made two or three curves and in going around the curves we got little or no water. Whenever we struck these stratas of gravel, then our water supply increased perceptibly. Some days we had less than the day before by reason, I suppose, that during the day we got practically no water and lost a little by seepage or evaporation. I think the greatest increase in a day was about 30 inches. The first increase that amounted to anything was 140 to 151. Then dropped back the next to 150, and then increased to 162, in one day. Then 268 to 281. Sometimes we went from 30 to
680 60 and occasionally 70 feet a day, and it depended upon the material we got into, too, and whether it caved in on us or not. Two or three days the banks caved in and we hardly made no distance at all. Then in working there the water would get impregnated with the sand, sarrying it down, and that would frequently fill up the weir sometimes and they were not very particular about the measurement; when it would show a decided advance when they would clear up the next morning, we would take an accurate measurement, which would show the amount of water that was there accurately; but when it was very full of sand, you know, the sand working down, it would naturally fill up in front of the weir, and, being muddy, you could not see whether it was or not, you could not tell whether the conditions were—— The gravel through

that tract runs in streaks. Just the same thing in Pomeroy and Hooker's. In those streaks of gravel found the greatest amount of water. There is no regularity how often the streaks of gravel occur. All of the other strata is more or less moist, and water seeping from it; but the gravel would naturally be freer, so water could run freer and flow in there.

CHARLES M. PARKER being duly sworn as a witness for the defendants, testified: Reside at Pasadena; acquainted with the values of water for irrigation and domestic uses, and supplying inhabitants of cities with that article in this section of the country and have been for ten years. Know the Providencia rancho. Know where the tract of land is situated. In my opinion, the value of water per inch, developed in that section of the country, which could be delivered to the city and to the country east and west of here by gravity, if the development amounted to 500 or a thousand or two or three thousand inches, under a four-inch pressure, it would be worth $1,500 an inch.

681 Cross-examination:

Am president of the Lake Vineyard Land and Water Company, that supplies water to Pasadena. I think it would have been worth 25 per cent. less in June, 1893.

JAMES CLARK, sworn for the defendants, testified:

Have resided in Pasadena 17 years, and know the values of water in this section. Am connected with the Lake Vineyard Land and Water Company. Am a director. Have been through the Pomeroy and Hooker tract. Know the general section of the country. In my opinion, water developed at an altitude sufficient to bring it to the greater part of Los Angeles city and the country east and west of here, by gravity, and developed on that tract of land, would be worth from $1,200 to $1,500 an inch. Should judge it is worth 25 to 33⅓ per cent. more now than it was in June, 1893.

Cross-examination:

If I had the property now would bring it to the city of Los Angeles. If the city had sufficient water for its own ne-ds, I would not particularly want to run against the city, but there is a good deal of farming land that would be glad to get that water for irrigation purposes, aside from the city; to the east and west of it. If there was no use for it, it would not be worth any such an amount. If there is no use for it, there is no value of anything.

Redirect examination:

I have just been through the country of Los Angeles and the Cahuenga conntry. I am not so well acquainted with that part of the country as I am here. In going through that country didn't

cross any considerable streams of water. Know something of
682 the general character of that kind of agricultural purposes. Have been out east of the city; found no streams of any magnitude, until you reach the San Gabriel river. If the water developed on this land will cover the greater portion of the Cahuenga country and this country east of here, I consider it would have a value regardless of the question of whether the city of Los Angeles had a supply, or not. Would consider that it would have the value that I mention.

W. H. ANDREWS, called as a witness for the defendants and sworn, testified: I reside at Tolucca, in the San Fernando valley about two and one-half or three miles from the land sought to be condemned. Have resided there eight years. My business is fruit-raising and real estate. Ever since I have been there. Am acquainted with the values of property in this section. Sold for the Lankershim Ranch Company and the Pacific Improvement Company about four years ago. Knew the values of land in 1893. The 314-acre tract is worth $100 an acre as a whole; there is a difference in different parts.

Cross-examination:

Did business for the Providencia Land Company. Acted as agent for them. Know when the Providencia Company had their sale and about the time Pomeroy and Hooker bought this land. Latter part of 1892, I think, or the early part of 1893. Don't know what Pomeroy and Hooker paid. The property immediately adjoining on the north sold about that time I bought a piece about a mile above there, and paid $105. On the high ground in the fruit land, that had been cleared, and set to trees. Don't know that this land is subject to overflow. I think the river carries about all the water there is. I never saw it overflowed. Have lived there about eight years. Part of the bottom land has been overflowed, I think. I never saw it.

683 Redirect examination:

I have seen floods up there some time ago. About four years ago. It lasted about three or four hours. The river ran down in about 24 hours.

CHARLES FORMAN, sworn as a witness for the defendants, testified:

Have lived in this section of the country about 13 years. Been engaged in various occupations. Street railroad business, mining and farming. Am acquainted with the tract of land sought to be condemned, and of the value of real estate in that section. Known of it for six or seven years. The value of that property, independent of any question of water rights, for agricultural and other purposes, is from $100 to $120 an acre, and its value was practically the same in June, 1893. Have been on the cuts made upon this

tract of land. Observed the water flowing in them. Saw it coming in from the sides and bubbling up in the bottom. Observed no difference as to the quantity coming into that trench, one place from what it was at another. My recollection was it was coming in—percolating in—all the way from the upper to the lower end of the cut. The greatest quantity was at the outlet. The increase in the cuts was gradual. Could not discover any difference in the amount which came in from one side, from that which was coming in at the other.

Cross-examination:

Examined those cuts and the water at Mr. Pomeroy's request to look the property over and put a value on it. Formed my opinion of what I know of land in that neighborhood, and land further up the river. Very little of it that is not fit for cultivation. Very little of it that is overflowed, in my judgment. The land north of the river is not subject to overflow annually, in my judg-
684 ment, nor generally. I should judge from looking at it that it has not been overflowed for a number of years. Don't think land covered with as heavy a growth of willows as that would ordinarily be overflowed every year.

Q. You spoke of the value in June, 1893; do you think it could have been sold at that time for that figure?

A. I think so; yes, sir.

Q. Didn't you hear about that time that Pomeroy and Hooker were trying to sell the land to the city at $30,000 and that the city refused to give it, and that nobody else did give it?

The defendants objected to the question on the ground that it was irrelevant, incompetent and immaterial. The court overruled the objection and the defendants excepted.

The witness answered: I read something about it in the newspapers.

By Mr. SCOTT:

Q. Well, you were satisfied that was the case, weren't you?

A. Yes sir. I don't recollect of talking with Mr. Pomeroy about it. I cannot give a statement of the different parts of this land with the values attached to each; I didn't look at it with that view at all.

Redirect examination:

Q. Mr. Forman, do you know anything about this assumed proposition of Messrs. Pomeroy and Hooker to sell this land to the city of Los Angeles beyond what you read in the newspaper?

A. I don't recollect. I have no recollection of ever talking with Mr. Pomeroy about it.

Q. Do you remember anything about what you did read in the newspapers?

A. Well, I have an indistinct recollection now that the statement of the newspaper was that they were to take quite a number of acres

more—the number of acres was quite a good deal more; but
685 whether it was the same land, or where it was located as to up and down the river, I don't recollect.

Q. Did you read anything about whether the city did accept the proposition or not?

A. I think I read that they refused to accept it.

Q. That is what you think?

A. That is my recollection, yes sir.

Q. Don't you know, as a matter of fact, that they did accept it, do you?

A. That they did accept it?

Q. That the city did accept it.

A. I don't know that, as a matter of fact, no sir.

Q. All the recollection you have of it, at the present time is your memory of what you saw in the newspapers.

A. Yes sir.

GEORGE E. FRANKLIN, sworn as a witness for the defendants, testified: Have lived in the city of Los Angeles since 1884. Have charge of the United States Weather Office. Keep a rain gauge. Standard gauge of the service. Consists of a receiver, which is a circular basin like you see this. It has a brass rim an inch and a half high, and is beveled on the edge. And it is conical-shaped inside. It strains the water down into the reservoir, which is this long brass tube. It is 20 inches high. The rain is measured by a graduated stick inserted through the hole in the top, and the proportion is as one to ten, that is a sixth of the area of the reservoir is one-tenth of the receiver. Where it is accessible, the ground is the best locality. In cities it is not practicable on account of the business needs of the office. It must be on the roof of a building. And they select as a rule the flat roofs and put the gauge in the centre as near as they can. We put our- on the flat roof, on the Wilson building, corner of Spring and First street. We get our reports of the rainfall at San Fernando station from the publication of the service. They don't come to me direct. They are taken from the Southern Pacific Railroad Co.

686 M. R. LOPEZ, called on behalf of the defendants, being duly sworn, testified as follows:

Have lived in San Fernando all my lifetime. Am a telegraph operator and station agent of the Southern Pacific. I and a gentleman named Needham kept the record of the rainfall at that station for the last ten or a dozen years, and a man named Sheridan. I have been engaged in that business for ten years. The kind of gauge is like the sample. (Here witness produces sample.) It is three inches in dimensions.

Q. How do you adjust it for the purpose of obtaining the rainfall?

A. I generally set it on top of the depot right on the peak of the roof. And I measure the amount with this stick which has got the number of inches on there. I just put it in there, and that gives me the amount of rain. The rains in that section are usually ac-

companied with a little wind. Sometimes it blows pretty hard. Sometimes mild. Have been using this gauge about three years. Before that used this form (producing another gauge). That is a little smaller than the one now used. This is two inches in diameter and is adjusted the same way.

E. BOUTON, called as a witness for the defendants, and being duly sworn, testified as follows:

Have lived in the city of Los Angeles 28 years. Been in the real-estate business since November, 1868. Know the tract in controversy. Knew this in 1871 or '2. Up there three weeks ago. Its value a independently of its being a reservoir of water from which water could be developed, just for the ordinary purposes for which the lands of that section are used, I think is worth twenty-five to thirty thousand dollars. I think it would average about a hundred dollars an acre, including the timber on a portion of it. I don't think there has been any change in the values since June, 1893. Certainly no advance. Have had some experience in the devel-
687 opment of water, and dealt in waters, as well as land. I know the tract of country west of the city of Los Angeles, from the foot of the Cahuenga range to the sea, pretty well. Been over it very many times; it is very inadequately supplied with water. I would not think that a quarter of it is supplied with water at present, and that is inadequately supplied. Know the country east of Los Angeles, to the San Gabriel river. Know the Rapetta ranch. Am acquainted with the slope of the hills east and to the southward of the Los Angeles river, as it goes through the Laguna ranch. That country is very inadequately supplied with water. Along the foot-hills of the Rapetta ranch, I don't know of there being any. There are no natural streams there, that I know of. I have been over it very often in former years. Had sheep over that country. Water developed on this tract of land at an altitude sufficient to furnish this Cahuenga country and the country east of the San Gabriel river, considering also its location with reference to the city of Los Angeles, would have been in June, 1893, in my opinion, of the value of a thousand dollars an inch.

Cross-examination:

To go down to the Rapetta ranch and through that country, you would have to go through the city of Los Angeles. I am not lawyer enough to answer the question of getting through the city like this with the conduit, but as I understand it, it would not cost much, for I believe you have a right to go with water pipe where you don't have the right to go with some other things. Naturally there would be considerable expense in laying a conduit through a big city like this. If Mr. Pirtle and Gen. Forman on his land and the people to the north and west should succeed in getting out ten or fif-
688 teen thousand inches of water by the same means that Pomeroy and Hooker propose to get out 3,000 inches, that water would have to supply one general country from here towards the

ocean. It could not be carried out to San Gabriel, I think. But I think taking the Rapetta ranch and the Laguna ranch, Bell's ranch, the Nadeau vineyard and all that country, and the country down on the San Pedro ranch, that country around Wilmington and up there that is not supplied with water, and then west as far as you could go from that elevation, I believe there would be land enough to use ten thousand inches of water. It occurs to me that there would. If there were so many water plants producing so much water, the price might be lowered, but I understand the question that I answer included a contingent domestic use, and the value for domestic uses would be much greater. That use would be in the city, and I took this value into consideration in putting this value on it. I could not judge in regard to the cost of the right of way through the city, because I don't know what rights they have. I have had an impression that the constitution gave them some rights for water pipe that it did not otherwise. Whatever it might cost to buy the right of way, if any, would be deducted from my estimate. I don't own a foot of land north of the city.

HENRY NICHOLAS was called as a witness for the defendants, and being duly sworn, testified as follows:

Resided at Burbank for 14 or 15 years, and am a farmer. Know the land in controversy. Acquainted with the value of real estate in that section. Been over this tract about six months ago. Knew the value in June, 1893, and in my opinion the value of this land, exclusive of any consideration of its water resources, is about a hundred dollars an acre.

689 Cross-examination:

Have known land in this vicinity to sell at that figure. In this same bottom. To the east of this land. In the Providencia ranch. Different parties sold it. Burbank sold some; this was six or eight months ago. You can buy some of that land there from fifty to a hundred dollars an acre; then again you have to pay as high as $150 to $200 an acre for wild land, or land that has been cultivated once.

CHARLES C. BROWN being called as a witness for the defendants and sworn, testified as follows:

Resided in Pasadena since 1879. Know the value of water in this section, and estimating that I could develop from 500 to 3,000 inches on this land, at an altitude sufficient to cover nearly the whole of the city of Los Angeles, and the country east and west, by gravity, I think it would be reasonable at $2,000 an inch.

The water for agricultural purposes outside of Los Angeles city would be worth just the difference of what the land would sell as dry land and with water on; it would raise the land from $1.50 to probably not less than $25 an acre.

Cross-examination:

I don't know where there has been any water sold at a figure per inch; if the city of Los Angeles had plenty of water which the city owned itself, it would not then be a paying proposition to run in and compete with the city.

W. N. MONROE, being called as a witness for the defendants and sworn, testified as follows:

Reside at Monrovia. Been in this section ever since 1874. Real-estate business and growing oranges in Los Angeles county. Been on the tract of land sought to be condemned several times
690 in the last five or six months. Am acquainted with the values of real property in this section for the last 3 years, and I should think this tract of land, independent of its value as a source of water supply, is worth $80 an acre for the whole tract. Have had considerable experience in developing water at Monrovia and also at Burbank. Have seen the excavations on the Pomeroy and Hooker tract and saw how the water came in. There is percolating water coming through the sand and fine gravel. The water seems to be coming from the bottom. There is a gradual increase in the cuts all the way down to the river. No marked difference at different places as to the quantity that is coming in. Certain spots you would see it bubbled up. Then there would be a vacant place, and you would not see it bubble at that time. In any section of ten or a dozen feet, compares with another section, it was about the same all the way down. I was superintendent of the Pirtle development. The material is sand and gravel, and there was coarser gravel up there, and we were deeper in the ground than the cut at Mr. Pomeroy's land. The length of the canal that was cut there is 4,058 feet. The water comes into that cut from the sides and the bottom. Am acquainted with the value in this country, and I should say that water developed there from 500 inches above, would be worth fully $600 an inch, in that location. Five hundred inches would be a sufficient quantity to pay. Anything above that would be better. I was not acquainted with the particular locality in June, 1893. I am only saying what I know for the last five months.

F. B. YOAKUM, called on behalf of the defendants, and being duly sworn, testified as follows:

Have resided in southern California seven years. Lived in the city of Los Angeles and now reside in Santa Monica. I lived here part of the year 1892, '3, '4, '5 and part of the year '96. Am in the real-estate business. Been in it ten years. Know
691 the tract in controversy. Know the value of land in that vicinity. In June, 1893, in my opinion, this 314-acre tract, taken as a whole, was worth a hundred dollars an acre, for agricultural purposes.

M. L. WICKS was called on behalf of the defendants, and being duly sworn, testified as follows:

Have lived in this county since 1875. Been in the real-estate business here since 1877. Am acquainted with the value of land in this vicinity for the last ten years. Know the tract of land sought to be condemned. Used to be frequently on it when I was in the Citizens' Water Company. Was out there two or three weeks ago. In June, 1893, I think that ten per cent. of the land would be worth $10 an acre. Another 10 per cent. probably $50, and eighty per cent. of the land is very fine for raising alfalfa and walnuts and after it was cleared up would be worth $125 an acre. The value of the wood upon the land would pay from one-third to a half of the cost of clearing.

Cross-examination:

It would cost about $8 an acre to clear it, in excess of the wood. Might run over $10. No use has been made of it to my knowledge. I don't know why. I know there is some elegant farming land there that is laying waste for several years. I don't know why. If the land is subject to overflow, people could not plant alfalfa, but that is not the case with this land I speak of as being elegant farming land. It is not subject to overflow. The river sometimes changes its bed but it does not overflow this land. There are trees there 18 inches in diameter, willows. I think that to a party desiring an alfalfa farm, this land was in June, 1893, worth $33,000, irrespective of the value of the water that could have been taken from the land and sold elsewhere. I think it could have been sold for
that. I don't know of such a purchaser that wanted that
692 piece, but taking other values of land, I suppose it could.

Q. Supposing that you would have wanted a tract of land that size for the farm you have been speaking about, would you have paid for it with the idea of making a profit on it?

A. I am not a farmer as far as that is concerned, if you take my personal experience, I would not buy it at $50 an acre if I had to live on it and farm it.

Q. Well, didn't you hear about June, 1893, that Pomeroy and Hooker gave an option to the city of Los Angeles for this same tract of land, with an addition of about a hundred acres more, for $30,000 and that the city refused to take it?

The counsel for the defendants objected to the question upon the ground that it was irrelevant, immaterial and incompetent.

The COURT: I am not quite sure of that in regard to the city refusing to take it.

Mr. SCOTT: We will withdraw that part then, "the city refused to accept it."

The COURT: I will overrule the objection then.

To which ruling of the court, the defendants duly excepted.

The witness answered: I don't know what land was offered. I heard there was an offer made, but I don't know what land it was.

I never spoke to Pomeroy and Hooker in regard to that option. I never had any conversation with them on that subject.

Q. Well, did you meet either of those gentlemen shortly after this city option expired, or during the time it was in force?

A. Counsel for the defendants objected to the question upon the ground it was irrelevant, incompetent and immaterial. And upon the further ground that it assumes the fact that has never been proven in this case at all; that any such option ever existed.

The court overruled the objection and the defendants excepted.

693 A. I never had any talk with them about it, and it was merely that I have heard some rumor that there was some sort of an offer made to the city. But I do not know what land the offer was, nor do you know the price they put upon it in the offer to the city. I read the newspapers. I don't know that I read anything about this land, and I don't remember if I did, except that I knew there was such an offer made, but the extent of it or the amount of it, or the land, I did not notice.

E. F. BILLMEYER, called on behalf of the defendants, being duly sworn, testified as follows:

Been interested in a water plant on the west side of the city about eight years. Am acquainted with the values of water per inch under a four-inch pressure in this section of the country; the general location of the tract in controversy. My opinion, in June, 1893, water developed on that tract to the amount of 500 to 3,000 inches, under a four-inch pressure, would be worth $1,500 an inch.

FRED W. WOOD was called as a witness for the defendants, duly sworn, and testified as follows:

Have lived in Los Angeles city 22 years. My occupation now is street-railroad manager. In the last 15 or 20 years I have been in a good many kinds of business. Have been familiar with real estate. Am a civil engineer by profession. Have had charge of the San Gabriel winery and the cultivation of lands in that section. On lands myself in San Bernardino county. Agricultural lands. Am acquainted with values of water in this section of the country and have been for several years past. Know where the Pomeroy and Hooker tract is. If water could be developed there to the amount of 3,000 inches, measured under a four-inch pressure, and at such an altitude as that it could cover the greater part of the city and the Cahuenga country and off to the east of Los Angeles, in my
694 judgment I think a conservative estimate of its value would be from five hundred to seven hundred and fifty dollars an inch. On anything over 500 inches up. Am acquainted with the country east and west of the city and south of those range of hills and to the sea, and know the character of that country and about how they are supplied with water.

Cross-examination:

The value of water developed in a given locality depends upon the market for it, and the question of competition would affect it. If there was an established municipal system of water works here, it would come pretty near filling the bill in the area it would cover. As to whether there would be in the immediate vicinity an opening for other waters, of course, I can't undertake to say. If the city had its own water works, I don't think there would be much business in putting two systems of water works in one locality. If it were shown that there were other lands owned by other parties where water to the extent of 10 or 15 thousand inches could be developed, to compete with this water, in covering the same locality, it would detract from the value of the water, as a business proposition, if there was a surplus. The price per inch would be relatively lower.

Redirect examination:

I am pretty well acquainted all through Los Angeles county. I don't know what proportion of the total area of this country is lying idle and not paying anything to anybody, but there is a good deal of it. There is lots of good land that is lying idle, so far as that is concerned. In the tracts of country I speak of, south of the Cahuenga range and east here to the San Gabriel river, along
695 through the Rapetta ranch, and the south of these hills, if there could be 15,000 inches of water developed either on this land or its vicinity, at an altitude sufficient to cover the tracts of country that are spoken of, I think if you put in your conduit system and get it out, you will find plenty of land to put it on.

Q. For aught you know of any source of water supply, do you think that there is any probability of any such competition as would lower the values of water?

A. Well, I think my estimate of 500 to $750 dollars an inch is a conservative estimate, even in the view of a reasonable amount of competition. I think the value is about the same now that it was in June, 1893. Of course in forming an estimate you have to take into consideration the present conditions, and of making water available in the city of Los Angeles, and the possibility of that as a market for the water. But if there is a large volume of water there, and you had the works down here, it might run into a good deal more price than I have named. I tried to keep that out. I know how the city is supplied with water now. With the supply that the city now has, I think there could be found territory in the city that could use up a very considerable supply of water, that is not now supplied, or isn't very well supplied, so that there would be a market for a considerable amount of water here. I think it is true that there is a considerable portion of the city that is not supplied now, unless out of zanjas. There are some parts of the city that there are no pipes laid.

R. W. MARTIN was called as a witness for the defendants, duly sworn and testified as follows:

After testifying that he knew somewhat the value of water in this section of the country for the past eight years, said in his opinion that water developed upon this land to the extent of 500 to 3,000 inches, would be worth from $1,500 to $1,800 an inch, already developed.

696 W. B. CULLEN was called as a witness for the defendants, and being duly sworn, testified as follows:

That he lives in Glendora and has lived in the county 21 years and lived in Los Angeles city. Was at one time tax collector of the county. I am acquainted somewhat with the values of real property in the city of Los Angeles and the vicinity, not particularly in the city but more so in the country; I know the tract of land that is sought to be condemned here simply by passing over it. I have not been acquainted with the value of property and lands and waters for some years immediately in the city of Los Angeles. Along in my neighborhood at Glendora I am acquainted with the values to some extent. I know the section of the country to the east of the city of Los Angeles to the San Gabriel river and the Repetto ranch and the Laguna. I am very slightly acquainted with the country to the west of Los Angeles, I have been over it and know its character. It is good for deciduous fruits and various other purposes, general farming along the foot-hill regions; there are a good many thousand acres.

Q. Assuming that upon this tract of land sought to be condemned here, and eight or nine or ten miles north of the city there could be developed from 500 inches measured under a four-inch pressure, to 3,000 inches, at an altitude sufficient to cover the greater portion of this tract west of the city and of the lands east, as well as of the city of Los Angeles, what, in your opinion, would that water be worth per inch, developed on the land and what would it have been worth in June, 1893.

A. Well, if it were in my locality I could form a better estimate. I am not familiar with the water in the city. But take, for instance, the Cahuenga valley, or east of the city, the conditions would be about the same that they are in my locality, and I have an idea it would be worth about the same that it would in my locality.

697 THE COURT: You have no acquaintance with the actual value?

A. In this location I don't, no sir.

Q. Situated as this property is said to be?

A. Well, I say, in my neighborhood I am; but—I suppose the conditions would be about the same, east or west of the city.

(COUNSEL FOR DEFENDANTS:)

Q. And do you know the value of water per inch for the purpose of supplying agricultural lands of that character and of those needs in this section of the country? I don't mean now in the city of Los

Angeles alone. What it might be worth for municipal purposes, but worth altogether, for any purpose?

A. Well, yes sir.

Q. What, in your opinion, under the conditions that I assumed here, that from 500 to 3,000 inches of water, measured under a four-inch pressure, could be developed upon that tract of land at an altitude sufficient to cover those sections of country that I have mentioned, by gravity, without the aid of pumps—what, in your opinion, would it be worth per inch?

COUNSEL FOR PLAINTIFF: That is objected to on the ground it is incompetent, irrelevant and immaterial and that the witness has not been properly qualified and also that the market value of the water is not called for and that it calls for the present date and not for June, 1893.

COUNSEL FOR DEFENDANTS:

Q. I will modify it and ask what was the value in June, 1893?

COUNSEL FOR PLAINTIFF: Our objection is renewed to the question as amended.

The COURT: The market value?

COUNSEL FOR DEFENDANTS: The actual value.

COUNSEL FOR PLAINTIFF: It calls for the value for these purposes and not for the market value, what it could be sold for.

The COURT: I will sustain the objection.

To which ruling the defendants excepted.

Q. I will now ask you, Mr. Cullen, the same question—
698 assuming these conditions to exist, what, in your opinion, would have been the market value of that property, the 500 to 3,000 inches of water measured under a four-inch pressure, on the 27th of June, 1893?

A. I would say anything from 500 to 800 inches—eight hundred dollars per inch, miner, measured under four-inch.

The section of country that I live in is 25 miles from Los Angeles.

M. G. McCOON was called as a witness for the defendants and being duly sworn, testified that he was acquainted with the values of real property in this section of the country *and* the last thirteen years, and knows the tract in controversy. That in June, 1893, its average value was in the neighborhood of a hundred dollars an acre. Knows the remainder of the 1,400-acre tract and in his opinion the remainder of it would be damaged by the taking of the 314 acres to the extent of $4,000. At least four or five thousand dollars. His valuation of the land and was irrespective of the question of taking out the water.

It was here stipulated between the parties that the documentary evidence that had been introduced before the court on the particular issues presented by the court, should be considered in evidence in like manner before the jury, as if they were formally offered and

read and subject to the same objections and exception as taken at the time, and with the limit to it that both parties might use any or all of it in the argument to the jury, without the necessity of reading it to them.

M. L. WICKS was recalled and testified that he was president of the Citizens' Water Company in 1889 and '90. I remember of heavy rains in December and January. Exceedingly heavy. For a while during that winter, in December and in January, I was up there about once a week. Our dam went out at the headworks where we diverted the water. That dam was located a little lower
699 down but on this same land and where the dam of the present city ditch is located and on the tract of land sought to be condemned. I know the heaviest flood was in the latter part of December, or early part of January. For a short period of time, less than a day, there was a portion of that land overflowed. There were heavy rains and a breakage of a reservoir above, and there was part of it overflowed for probably five or six hours, and our dam went out at the same time. With that exception I never saw that land overflowed at any other time, except in the white sand, the channels of the river. It is not overflow land.

Cross-examination:

When our dam was washed away the channel of the river changed to quite an extent; our dams were simply brush and sand and through winter they would go out and we would have to build a new one; I don't think I was there during the winter of 1892-3; I don't know whether it was flooded then.

Defendants here rested. Thereupon the plaintiff in rebuttal introduced the following evidence:

C. S. COMPTON, called for plaintiff, sworn and testified substantially as follows:

I am the city engineer of the city of Los Angeles. This map showing drainage area of the Los Angeles river above the south boundary of the city of Los Angeles, was made under my direction in my office. The portion of it which is inclosed in red lines and marked "Big Tejunga creek 134.17 square miles" is supposed to be the mountain watershed of the Big Tejunga and the figures show the area in square miles of that shed. The same of the Little Tejunga creek and Pacoima creek; and the other portion enclosed in red lines is the San Fernando basin or valley. The portion marked "Verdugo creek, 33.37
700 square miles," does not affect the water flow under the property in controversy. And the same can be said of the Arroyo Seco, as shown on this map. The total area of the watershed, from this map, is, I believe, 458.7 square miles, above the land sought to be condemned, and does not include the Verdugo, Arroyo Seco, nor that portion of the San Fernando valley below the land proposed to be condemned. This map was compiled from report of William Ham Hall, State engineer in 1888. The small circles

occurring at many places on the map, in which are the letters "Elev." followed by figures, are intended to designate the elevation above sea level, in feet, at the point where they are located upon the map. The point upon the map marked "Proposed headworks" is the land sought to be condemned, and to the north of it where the word "Burbank" occurs, is the town of Burbank. The red lines are the boundary lines of the different watersheds, the names of which are set within the lines, at the different places. And the city of Los Angeles is the square marked upon the map in the southeast corner, and marked city of Los Angeles. In that portion of the map marked "San Fernando valley" occurs first, the figures 132.88, foot-hill land. That means that there is within the watershed 132.88 square miles of foot-hill land. Below it, 142.31 of valley land, means that there are that many square miles in the valley, within the sheds. The balance, not designated upon this map, at that point, is mountain.

Map filed in evidence as Plaintiff's Exhibit 13 and made part hereof. This map marked "Map of lands sought to be condemned for the proposed headworks for the city of Los Angeles water supply, showing the tunnel line, filtration galleries, wells and so forth, topography and hydrographic contour on said land and land adjoining," was made under my direction in my office. The boundaries of the land sought to be condemned are designated on this map by the red borders.

701 Mr. CHAPMAN: We make an objection to the introduction of this map 13, upon the ground that it is irrelevant, immaterial and incompetent, and that its accuracy is not sufficiently tested to admit it in evidence; that so far as the witness has disclosed it is made entirely from the report of somebody else.

The COURT: I will overrule the objection as made.

Mr. CHAPMAN: Exception.

Witness resumes: This map was compiled from surveys made upon the ground, by my department, by men under my direction; and the block numbers are those of the subdivision of the Rancho Providencia subdivision and Scott tract, and are taken from the recorded maps of that tract. The land sought to be condemned as laid down upon this map was taken from the description of the land in the papers in this action, and actually surveyed upon the ground by men under me. The lines in the southeast corner of the map, the red lines with dots occurring in them every little distance and marked section 1, 2, 3, 4, 5, 6, 7, and 8, respectively, are lines indicating the location of well borings as made by the defendants in this case—and are the lines of wells which have been bored by the defendants. A line through this land running nearly straight and marked "Main tunnel line," is the proposed main tunnel line of the city water supply, and the lines running from it marked, first, filtration galley No. 1, No. 2, No. 3 and No. 4, respectively, are the filtration galleries from that tunnel. In the line with the black dots in it every little ways, along the street marked Main street, and an extension of its west line, near the letter

"C" and near the figure "8" at the top of the figures "526," the large black dots show the location of wells bored by the city, under my direction, and the small black dots show the location of wells bored by the defendants in this case. In the line
702 which is marked block line 8, next west of the last line described, the black dots which occur therein show the location of wells of the city. The large black dots on this map in all the parallel lines indicate wells bored by the city. The small dots in the red lines at the southwest corner of the map, marked respectively, sections A, B, C, D and E, indicate the location of wells bored by the defendants. The dotted or spaced line running from the point D in the northwest portion of the map on the south line of Verdugo avenue, in a southeasterly direction to the tunnel line at a point marked "C," shows the location of a cross-section or profile map—when they spoke of the plan of saturation—a map which shows a cross-section down that line. The line beginning with the letter "B" in the northwest portion of the map, and running diagonally down to the letter "A" on the main tunnel line, indicates the location of another cross-section for the same purpose. The blue line running through the tract is the Los Angeles river. The wide blue line marked "Los Angeles river"—the line in the southeast portion of the map, crossing the wells and marked "Pomeroy and Hooker lower ditch," is the lower cut of Pomeroy and Hooker, which has been testified here so frequently. And at the other end of the map a line marked "Pomeroy and Hooker upper ditch," is the upper one which has been spoken of in evidence here so frequently. The small circles upon the map like an "o," and near them "P. & H. well," with the figures show the location of the wells bored by the defendant—deep wells—and the figures indicate the number of those wells as I numbered them. The brown and yellow lines inclosing the square in this map taking up a large portion of the western part of the tract, are the boundary lines of the tract called "Cahuenga," and that is inside the Providencia rancho. The dotted, shaded space inclosed in brown lines in the
703 eastern portion of the tract, through blocks 48 and 49, 52 and 69, and a portion of 77, means the location of a sand wash. The hachures in the western portion of the map, indicate the change in the elevation of the ground, or abrupt change, a sort of a bluff. Upon this map are located several places marked "weirs" and numbered. Those are weirs placed there for the measurement of water. In each place where there is a dam marked here, there is a dam, as marked, and the names at all these places indicate the nature of the object, whatever it may be. The northern line of the land sought to be condemned, is also the northern line of the Providencia Park tract; and it is the southern line of the subdivision of the Rancho Providencia and Scott tract. The scale of feet and the scale or chains upon this map as indicated, is correct. Down at the southeastern part of the map is a note, indicating the manner in which the wells dug by Pomeroy and Hooker, and the wells bored by the city are indicated; that not was placed there by me, and is explanatory of the different dots upon the map. See also, "Blue lines in-

dicate hydrographic contours," those are the blue lines which run in an irregular manner across the map that brown figures indicate surface elevations from northeast to southwest. See also, in the note, above sea level, that means the brown figures upon the map, and they indicate elevations above sea level, of the point where they occur.

Those hydrographic contours or blue lines are the slope of the plane of saturation. The blue lines are two feet difference in elevation and they are called the water level. And each one of the blue lines, as you go farther down is two feet nearer sea level than the one above, and they follow the surface of the plane of saturation.

Map filed in evidence as Plaintiff's Exhibit 14, a copy of which is hereunto annexed. There are here three maps, the first of
704 which is marked "Profiles showing plane of saturation and geological formations as ascertained by test-wells bored on the land proposed to be condemned for headworks and adjacent lands." These three maps, the first one of which we have just read the title of, is marked "Block line B," and at the other end "Block line C;" the second one, "Block line A," and at the other end, "Block line F;" the third one marked "Block line E," and, at the other end, "Block line D"—are all on one map, of which the title is as you first read. It was cut for convenience of exhibit. The word "Block line B" on the end of the first of these maps refers to the map that has just been placed on exhibition. Those block lines are the lines indicated on that map and are numbered A, B, C and D, and so forth. "Block line B," as indicated upon these profile maps, is a profile of wells bored upon "Block line B;" on the map Exhibit 14. And "Block line F," "A," "C," "E" and "D" and each profile of a line of wells bored upon the respective block lines as indicated upon Exhibit 14. These wells were bored under my direction. Each of these long lines on the map of different colors indicates a well. The blue in those wells indicates water, and the different shades in each well indicate the different formations at that point. And those formations as indicated by those shades are named upon the map, and my designation of the formation is written there. Take the wells as shown upon the profile of wells bored upon "Block line F" at the bottom of well number 5, the word "gravel" appears, and you find that the bottom of that well is made up of small dots. That indicates, for the distance shown upon there, the borer found gravel. Above it you find a strata of fine dots, with occasional larger dots, in it marked "Very coarse sand and gravel." That indicates that, for the distance delineated on this, in boring that well, very coarse sand and gravel was found. The larger dots indicate the gravel in there. You find, then,
705 above that, a strata of finer dots marked "River sand." That was clear sand, and indicates that in that well and for that distance the boring disclosed clear sand. The blue line which crosses all the wells, and on each one of these profiles—crossing the wells at the top of the blue in the well, indicates the plane of saturation, or the water plane. You see on several of these profiles at the end of the deep wells bored, a row of shallower wells, and above them the

words "Wells dug by Pomeroy and Hooker." Those are wells dug in the same line, or upon a continuation of the same line, and bored by the defendants. The depth of those wells as indicated upon those maps, indicate the depth of the wells as they actually exist upon the ground; that is the case in each place where that occurs. And in all these wells, as marked upon these maps, the formation shown upon the map, and the words opposite indicating the nature of the formation, are correct representations of the facts as they existed in relation to the material in the well when it was bored. The line running along the top of the profile shows the location of the wells bored. It is a map, and these wells are bored as the map indicates they are, along the street line. This little brown irregular line just above the words "Block line F," shows the street, and shows the topography and the nature of the ground. There are different points upon this map, at which wells are marked as having been driven; they indicate actual points upon the ground at which such well was dug or bored, and it was bored to the depth and with the results found as indicated upon this map. The different names and designations upon this map are correct designations, wherever the name occurs.

Mr. DUNN: We will offer this map in evidence; and I guess we will have to offer it in three.

706 The three profiles referred to filed in evidence as Plaintiff's Exhibits 15, 16 and 17, respectively, copies of which are hereunto annexed.

Witness resumes: This map, marked "Profile showing plane of saturation as indicated by wells dug by Pomeroy and Hooker at the western end of land proposed to be condemned for headworks," was made under my direction from actual examinations upon the ground. The profile below the letter "A" upon this map, indicates a profile showing the wells bored as located on this map on the line marked "A" at the western end of the tract. I refer to Exhibit 14 by "this map." It is a profile of wells bored on the line marked "section A," on Exhibit 14, and "B" upon this map is a profile showing the plane of saturation in the wells bored on the line marked "section B;" and that is true of the profiles lettered "A," "B," "C," "D" and "E." They indicate the plane of saturation in the line of wells marked sections "A," "B," "C," "D" and "E" in the southwest corner of Exhibit 14. The upper black line on each profile indicates the surface of the ground, and the blue line, the plane of saturation, on February 4th, 1896—the solid blue line. The dotted blue line below the solid blue line indicates the plane of saturation, as observed on February 29th. In each of these cases, the solid blue line represents the plane of saturation as it was on February 4th, and the dotted line below represents the plane of saturation as it was on February 29th, 1896. The map marked "Profile showing plane of saturation as indicated by three-inch wells driven by Pomeroy and Hooker at the eastern end of land proposed to be condemned for headworks," was made in my office, under my direction, and from actual measurements and surveys upon the ground. Each

of the profiles upon that map has above it a section number, beginning with section number 1, the profiles are numbered to section No. 8 inclusive; those section numbers refer to Exhibit 14, and the
707 sections are located on Exhibit 14 at the eastern end of the tract sought to be condemned, by section lines marked. Each of these lines indicate the plane of saturation of the line of wells in the southeast corner of the tract, and marked respectively sections 1 to 8. These profiles were only taken once, (referring to another paper), the plane of saturation was only fixed once. The dark line at the top of each profile is the surface of the ground; and the blue parallel or practically parallel blue line below it, is the plane of saturation. At the end of each of these profiles as well as at the end of each profile on the other map, the plane of saturation drops down to a blue spot marked "river;" that is in each case the Los Angeles river. You see, in some of the profiles marked "A," "B," "C," and "D" the words at a lower point on the profile marked "Tejunga creek." That is the point where the Tejunga creek runs through the water plane. And the names of each of these wells shown upon all these profiles is the name of a well bored by Pomeroy and Hooker; and the figures near that name, 1, 2, 3, 4—that is the distance of each well from the starting point; a fixed point. The figures above each one of the wells refer to the corresponding number of Exhibit 14. The distances in each case are from a given starting point, which is designated on Exhibit 14. Each of those larger squares upon this profile paper is 10 feet in vertical distance; and they are subdivided into 10 equal parts, and those parts into 5 equal parts. Then the large squares, from 480 to 490, and thence to 500, and thence to 510, and so on, is 10 feet in vertical distance. The profiles in the wells and so on, are laid down in such a manner as to indicate by those squares their exact depth. The figures which are at the top of each well indicate the distance from a given starting point, in feet. For instance, this is marked "6 plus 71.9." This indicates that is 671 feet and $\frac{9}{10}$ from the
708 starting point. It is a method surveyors have. And that is a fact, each place where the figures occur. Then there are other figures, "dug well," so and so, each one having a different number. We took the numbers to the wells as we found them on the ground. Each well was numbered by the defendant. The numbers on the map Exhibit 14, correspond with the numbers of the profile; and each of the wells bored by them and indicated on Exhibit 14 by its number, corresponds with the number of the same well on these profiles.

Profile maps referred to filed in evidence as Plaintiff's Exhibit 18 and 19 respectively, copies of which are hereunto annexed.

This picture, indicated as "profile on line C–D," was made in my office; it indicates a cross-section or profile taken in the location as indicated by the line C–D on that Exhibit 14. This picture represents a cross-section on a line beginning at the letter "C" and running up to the letter "D" on this map.

Q. By a "cross-section" you mean it indicates, as nearly as can be

determined from the boring of wells and examination that you can make, how that would appear if the surface of the ground was cut right off at that point?

Mr. CHAPMAN: We object to it on the ground that it is leading.

The COURT: I believe I will overrule the objection.

Mr. CHAPMAN: Exception.

A. Yes sir.

Witness resumes: By the word "cross-section" I mean the intersection of the valley up there, across at that point. That is the way, in short, in my opinion, that it would look if the valley were cut right in two at that point, taking a side view of it. The blue portion of this map or picture indicates water. As marked upon the map that is the plane of saturation. The strata of
709 material just above the water is composed of sand. That is marked by the word "sand" upon the picture; and the strata immediately above that indicates soil; and the coarser black line at the top indicates the surface of the ground. In the blue, and just below the words "plane of saturation," occurs a strata in the water made up in this map of dashes. That strata is composed of sand. Then at the bottom of that strata appears a strata which is indicated on this map by circles and dashes of irregular sizes and intervals. That strata is composed of coarse sand and gravel, as indicated by the words upon the map. Here in one place upon this map is a diamond-shaped object, with the word "clay" in the center. That indicates a pocket of clay. This cross-section was determined upon in making the map of this cross-section, from well-borings made on the surface of the ground above.

I determined the cross-section from the well-borings made by me. There was no other source of information. I have observed the various cuts around and about this land; the Pirtle cut. Those matters were taken into consideration in making this picture of the cross-section. The cross-section was determined from actual borings upon the ground. This map marked profile on line A–B, was made under my direction in my office, and indicates a cross-section or profile of these locations as indicated on Exhibit 14 by a dotted red line marked A–B; begins at the letter A and running up to the letter B on profile B on Exhibit 14. That is a cross-section of the valley along that line, and was prepared from wells bored by the city, along the surface of the ground, along that line; and from those wells I determined the formation under the ground. The first strata or formation below the surface of the ground is the soil, next sand; the blue occurring in the sand is water; and below the sand formation is coarse sand and gravel and the little dark mark is clay in pockets. We marked all the clay
710 pockets that we found between those points. The wells bored along the surface of the ground above the cross-section, are about 1,200 feet apart. The wells marked on Exhibit 14 with dark spots, bored on the vertical line of the map, marked with large dark spots, are about three to five hundred feet apart. Those well-borings crossed these lines cross the line of this cross-section. At the left-

hand side of each of these pictures which have been produced here is a very low depression marked Los Angeles river.

That is where the surface water of the Los Angeles river flows. These pictures are drawn to a scale.

Profile on line C–D and profile on line A–B offered in evidence as Plaintiff's Exhibits 20 and 21, copies of which are hereunto annexed.

Witness resumes: These last two exhibits are not maps, they are pictures; and they don't purport to give the exact state of facts as it may exist under the ground, but are simply illustrative of the plane of saturation and the grade of that plane, and of the material to a certain extent. Take the line C–D, on Exhibit 4, at each end of the line C–D is a well bored; that gives the section, and at an intermediate point about thirteen or fourteen hundred feet from the lower end of this point marked C, there is another well bored that is probably a hundred feet away from this diagonal line below it. Then at points across we have wells that indicate the condition underneath the ground, that's probably some five or six hundred feet from the line; and the same condition exists clear through; and we made these pictures as you might call them, by the conditions that we found on either side, and having the actual facts at either end of the line. And on the line A–B on Exhibit 14 we have a well at the end of the line marked A, also one at an intermediate point probably 1,500 feet 711 from the point marked A, towards the point marked B.

And we also have these wells opposite at varying distances of a few feet, a hundred feet to five or six hundred feet. And the conditions were supposed to exist uniformly between those points, and these were made from that information. We have bored one well at each end of the line of these cross-sections and one or two on the line. The contour was taken from actual surveys on the surface—contour map. Those indicate properly the grade of the plane, as indicated by these contours, that is all. So this simply illustrates it in another way.

Cross-examination.

By Mr. CHAPMAN:

This profile 20 is what we imagine would exist at intermediate points along this line C–D upon this map No. 14, the same as we would if our wells were—take the wells along this line, in connection with the plane of saturation between those two wells, we have a supposition that the effect is the same between those two points. Here we are supposing that the plane is the same, although the difference may be greater between the wells. This profile No. 20, is what, in my imagination, in so far as we have the evidence, would be presented to the eye if I could look down into the ground along that line. And from that evidence it is that I have made up this profile to represent what I think would be there; that is, 21 is a simple representation of what I think would be along

this line A–B marked on this Exhibit 14. The first well at point marked A on this profile of line A–B is the well which indicated to me that clay strata. The first well is at the point marked A; and the next one would come at the point about half way between the points marked A and B. The point marked A on this profile is where the
A appears upon this map. That is the line A as shown at
712 the bottom—that is the pocket of clay. That clay here is where I struck it on the line A. There were no wells on the line A–B that we found clay. There was a well just off from the line A–B that we found clay—as indicated on map Exhibit 14, it would come at a point about 200 feet north of the Los Angeles river and to the south and west of there we have a well there which we found clay, and to the north and east of that point we have another well in which we found clay, about 500 feet distant from the line on either side. The well to the south and west of the line is about 300 feet north of the river, and the well to the north and east of the line is about 800 feet north of the river. This cross-section of which these are profiles runs in about a southeast and northwesterly direction. This profile is supposed to correspond exactly with these diagonal lines A–B and C–D. These profiles are supposed to be exactly on that line. I didn't have any well on that line north of the river that disclosed any clay at all. That sketch of clay there is drawn on the supposition that we are having clay on one side of the line, and on the other side the wells indicate it there that it fails to continue. This was on the supposition that the clay fails to continue. We suppose that the clay that we find is in pockets that are not extensive, for we have wells bored at a distance not to exceed two or three hundred feet, and in one well we will find clay, but in a well either side of it two or three hundred feet distant we find no clay. That's my answer. I didn't have anything except certain suppositions to fix it definitely. This map is not supposed to be an accurate representation of the condition of the soil there at all. It was just simply made for the purpose of showing the inclination of the plane of saturation as indicated by our well-borings—as we found it there in our wells. As far as the plane of saturation is concerned in that line we have wells bored in all directions
713 there indicating the level. We have two wells actually on that line; on the line C–D we have two also actually on the line. From the wells that we have bored I have filled up the picture according to what I have supposed would be presented to the eye if I looked at it, and that is all of it.

Mr. DUNN: Mr. Chapman, I will admit that, if it will save you any examination on that subject, that it is not made up to show any accurate idea at all; that it is simply to show an imaginary line of the plane of saturation; that the things are not actually existing there, but that the grade line of the water plane there is accurate.

Mr. VARIEL: Then you claim that the surface and the line of the water are the only things that are accurate there?

Mr. DUNN: We claim that the grade line of the surface and of the water are the only things that are accurate on it

Mr. VARIEL: And are they on a scale?

Mr. DUNN: You can ask the witness and find out in a minute.

Witness resumes: This profile is made on a scale; before I could tell the scale I would have to take the measurements on the map, and have to get the depths of the well-borings. I suppose it represent- a distance of several thousand feet.

The COURT: I suppose the exact scale is not material.

Mr. CHAPMAN: Well, if your honor please, I think it is material.

Witness resumes: It is not made on a uniform scale both horizontally and perpendicularly. The perpendicular scale is very much larger, for the simple reason the horizontal distance from A to B might be 3,000 feet, and the vertical distance might be only 30 or 40 feet; so that there is not a representation of the appearance there as it would be presented to me, so far as the dimensions horizontally and perpendicularly are concerned. The
714 approximate depth is probably about 40 feet, because our well-borings is probably 30 or 40 feet in depth. The surface of the ground here which is represented as not saturated with water at all is on the same scale as the blue line. The wells go to a depth of about 40 feet—was their original depth. When I made this blue shading that only represents what I imagine would appear at the bottom of our well; that isn't extended down to the bottom of the depth which the water may be. I know as a matter of fact that where they did sink wells deeper down in some places they did find water at a much greater depth. These hachures between the upper heavy black line and the next one below it on this line A–B, is just a different method of shading, to show a different stratification, that's all. The upper part is supposed to be soil. These marks on this map wherever they occur, are not intended to present an accurate idea of the character of the material. I did not mean by these marks with the spaces between them that in my judgment the rest of it that was not shaded black was all water. I presume the material there is sand and gravel all the way through except where these clay strata appear—or if they are not strata, whatever else they may be. The yellow tinge at places more than at other places within the blue stain is just simply part of the workmanship. The point is indicated by the intersection of a line, red dotted line, marked A–B, at the point where it indicates the Los Angeles river in Exhibit 14. In presenting this cross-section of the river the blue shading is intended there to represent the water level both in the surface of the river and at the saturated plane on each side of it. That is at that point all determined by the wells that we bored, and also by the wells that were bored by the defendants, and also by the river itself. It is a fact that the water plane on each side of the river stands above the level of the surface of the river.
715 In this profile on line A–B the line of saturation there is intended to show about the extent to which the river affects the water plane. And the same with the other. If I have the time at the noon recess I will work out the scale on those profiles, A–B and C–D, both the horizontal and the perpendicular.

Mr. DUNN: If it will help the matter, Judge, and bring out your idea, I will stipulate that the length of two thousand feet—say twice, at least, that may represent a depth of only forty feet.

Mr. CHAPMAN: If we can have the scale on there it will be perhaps much better to have it there, if it isn't too much trouble to put it there.

Mr. DUNN: I will have it done, anyway.

Witness resumes: This map showing the drainage area of the Los Angeles river above the south boundary of the city of Los Angeles, purports to have been compiled from the reports of William Ham Hall. I have never verified any portion of it. I simply constructed that map from the report itself. This map is an enlargement of the map which is on exhibit in William Ham Hall's It is simply an enlargement of a map which I found in his report. I don't know anything about why this particular place was marked here as the diverting place or parting place of the waters. I haven't been there myself; I wouldn't know where that place is on the ground. I don't know anything about what was embraced in the foot-hill lands along the San Fernando valley there as estimated by Mr. Hall; I don't know what he took for the foot of the hills. 142.31 square miles is valley land—I don't know what he includes within that term valley land. I have never been up on the Little Tejunga creek nor the Pacoima creek, nor the Verdugo. I have been city engineer since the 1st of January, 1895. These wells of which I have been speaking, were bored during February, 1896, mostly. I couldn't state the exact date
716 without making reference to the time that I put the men to work. We commenced our investigations preparatory to this trial, on behalf of the city, first in December, I believe, of 1895 some time. I believe we bored no wells then; I don't think we commenced our well-borings that summer. I am unable to state positively the date that we commenced our investigations; I can find out and state if necessary. I think there was about 40 or 45 wells bored under my supervision. We had three different outfits of well-borers; I can't recall their names at present; I am not personally acquainted with them. I employed the men and set them to work, and as far as their names are concerned, it is a matter of record in my department; but I don't remember their names; don't remember any of them. I was with them off and on every few days; I wasn't with them constantly; I would sometimes go up and spend half a day every day or two. Sometimes I would go up there daily for several days. Sometimes I wouldn't go up for three or four days. My knowledge of what's done in, and shown by these borings, is simply derived from their reports to me; it's not from constant observation. As soon as we completed a well we pulled the casing and used the same for the next well, to save expense. I can't tell anything about them by observation there; I presume the wells are destroyed; we can locate the exact point. I can locate where they were bored; we did it to save expense; I had no other object. They commenced pulling the casing immediately on com-

pletion of the well. I only had those wells under my personal observation, to observe what phenomena it would present, probably half an hour or an hour or so at a time—probably not over twice on any single well, and at an interval of one day. Then the casing would be pulled up, and after that further observations in that well couldn't be made. I do not remember by number
717 the profile on which a line was drawn which marked the water plane on the 4th day of February, this year, and another on the 29th of February, in which a difference appears. The lines A, B, C, D and E, as shown on Exhibit 18, corresponds to the locations as shown on Exhibit 14, where it is marked sections A, B, C, D and E, at the westerly end of the land sought to be condemned, near defendants' upper cut. Each of these large square spaces indicated on the profile 18, are 10 feet in vertical distance, and each of those squares represent 200 feet of horizontal distance. The difference in feet of the water level at those different times varied in different wells. Take it on section A, well No. 1 the difference is about two-tenths of a foot—2.4 inches; and the well No. 2 in section A, the difference in elevation is about three inches. I can't tell exactly whether it is greater or less than three, from the profile itself. It doesn't indicate the exact elevation, because we have to read it by the eye. The notes alone will show what the exact difference was. In well No. 3, same section, there is about four inches difference in elevation. And well No. 4 is about three inches. Well No. 5 is about two inches and a half. Well No. 6 is about five inches. Well No. 7 about three inches. Of course these differences are rough approximations taken from the profile and does not indicate exactly. Section A is above the head of the upper cut, and it's a cross-section—approximately at right angles to the cut, and, I should judge it was about 150 feet from it—125 feet. (Recess until 2 o'clock).

This is the same one we had up to adjournment; the profile at "A," "B," "C," "D" and "E." Those are profiles at the same places marked by the same letters on the Exhibit 14. Those wells are distant from the head of the upper cut about 200 feet. "B" is right across the head of the upper cut "C" is about 250 feet below.
718 "D" is about 300 feet below "C." "E" is about 250 feet above "A." I observed the water level on the 4th of February, and then it stood on the upper line; and on the 29th of February on the lower line. The variation between those dates is quite uniform, as far as you can detect it by the eye; about the same. I couldn't say whether the men were at work on that excavation from the time that the first observations were made, and between then and the time the second observations were made. I don't know; I believe they were. I was not there myself on the 4th of February; the observations were made by a deputy of mine, and I simply made that diagram from the reports of my deputy. I don't think I was there at all on the 4th of February. I couldn't say exactly how near to that date I was personally present at those places. I was up on the work—it is very seldom I went over there or four days without going up there. I was not on this particular

location within three or four days after the 4th day of February, I was down at the lower excavation a number of times, but at the upper excavation, at that time, I wasn't on the work at all. I don't know, as a matter of fact, that about one-third of that excavation was made after the 4th day of February. I couldn't state whether there had been a rain recently before the 4th day of February. I have the records of the city, but I couldn't state here, without them in my possession, exactly in regard to dates, in regard to the rainfall. I don't remember the dates. I remember the recent rain, but so far as the date is concerned, I couldn't state.

Mr. DUNN: See if you can't refresh your memory about that date, Mr. Compton, and give it to him, if you can. You refer to the recent rain?

Mr. CHAPMAN: I refer to the rain that occurred on the 27th and 28th of January.

Witness resumes: I do not know that there was such a
719 storm of rain on the 27th and 28th of January. I have never made any personal examination of those wells at any time, nor did I at the lower cut at any time, as far as taking measurements were concerned; only by inspection. The measurements were made by deputies of mine. Mr. Rank had charge of the party that made the measurements. Exhibit 14 was made directly under the supervision of Mr. Marsh, my chief draughtsman, from data furnished by the surveys made by Mr. Rank. I never made any surveys there myself. The river was never located on that map accurately; that is, in regard to all intermediate points. The river was not traversed, in other words. But we ran those block lines that are designated on here as block lines and wherever the survey crossed the river at those points, it was accurately located. And between those points it is not. Those bends are simply matters of estimate, or opinion, and not actual survey. The scale of that map is 200 feet to the inch, I believe. It was stated this morning, I believe, 100 feet to the inch; but it is 200 feet to the inch. The width of the river at the place where it makes that lower bend, right in the middle there of the tract, is about 130 feet, on that scale; and at the place where it crosses the boundary line of the tract sought to be condemned, as it proceeds northward from that curve, it is 110 feet; and a little further up from where I measured it last, it is 120. I don't know whether there are any such places in that river. I occasionally had something to do with making that plat or map; whenever my draughtsman would refer to me in regard to particulars and instructions in regard to certain matters, I would instruct him in regard to it. I had the general supervision. I didn't do a great deal of the detail work. I have been up on the tract, and along some portions of the river; I have been along this portion where I made
the first measurement, that is the extreme southern point of the
720 river in the bend there. I don't know as I made any special observation in regard to the exact width of the water there; paid no attention to it in that regard. Those lines which run across that map at short intervals represent water-level lines, showing the lope of the plane of saturation. Their distance apart is regulated

by their vertical distance. They vary two feet in elevation. So that, as they proceed southward and southeasterly those lines are marked at points distant from each other where the water level is two feet lower than the one next above it. Those locations of the water level were made at the points where we took our well-borings, of which I have been speaking. These figures in blue on the right-hand side indicate the distance above sea level. This I observe is marked 480; there are no wells at all on that line. The nearest well is within about 100 feet; the next nearest one is about 350 or 400 feet, north and south, about equally distant. Proceeding southwesterly from the one which I said was about 100 feet from it, the next well is on "block line A;" that would be a distance of about 1,320 feet. Going off in this direction, southwesterly, the next well, after this perpendicular, is in the line of wells bored by the defendant on "block line B." This well, I say, is about 100 feet from that line, and the nearest well would be about 200 or 250 feet. That is the one at that point just below the crossing of the river. Those lines were located after this method: We observed the elevation of the water in this well on "block line F," which is the first well northerly of the line mentioned. We take the elevation of the water in the well on "block line F," which is the first one south of the line mentioned, and then, by interpolation, we assume—taking the line of wells clear through, we find a uniform slope to the water plane. Therefore, we assume that the slope between those two wells was uniform, and we had
721 the difference in the elevation between those, and placing our contours at two feet difference in elevation we proportioned the distance between the two, for the horizontal distance of our contours. That makes the horizontal distance for this line. And then we do the same on this line, and on this line, and we found the direction between those points would give it the same general direction as we have given it here, by connecting those points. When I came to follow along the line which was bored there by the defendants, at this point which I said was about 250 feet from it, the line is deflected from the 480-foot plane to the northerly one, because the water comes to the surface there at that point; and instead of having a well at that point, we have the surface water. I couldn't say positively that this well doesn't indicate that this line didn't have that direction, because I haven't taken these elevations personally, or didn't make the map personally. I am simply stating the method by which the map was made. I was not present when any of the defendants' wells were made. I saw the wells made by the city at the time they were made

Mr. DUNN: Mr. Chapman, if it will do any good, at this time, and shorten the examination, I will stipulate with you that Mr. Compton did not make that map, and he did not bore those wells. And I propose to put on the men who were there all the time.

Mr. CHAPMAN: And he didn't make any data from which the map was made?

Mr. DUNN: Not at all. I will stipulate, however, that he wasn't

on the ground any oftener than your man, Mr. Friel was, probably, and that he didn't come nearer making the maps than Mr. Friel did himself.

Witness resumes: I neither made the map nor collected the data from which it was made; that is true of all these maps. As
722 far as the actual work was concerned, I did not make the map myself, and I didn't collect the data; but it was done under my supervision and direction. They reported to me from day to day regarding the progress of the work, and said to me what they were doing, and received instructions from me as to how to carry out further work.

Redirect examination.

By Mr. DUNN:

I directed that these wells be bored, and by whom they would be bored; and after arriving at the results of the borings, I directed that the maps be made, and who should make them; and that they should delineate the facts which have been ascertained from the borings. I am the city engineer. The red line which surrounds that property and is the boundary line of it, is the property line between Pomeroy and Hooker and the other property-owners on the north. The colored line is to emphasize, that is all. The real line of property between two property-owners is an imaginary line. It isn't as wide as that red line, but it is drawn there to show distinctly to the jury where it is. The same state of facts is true with reference to the river on that map. Mr. Bassell superintended the boring of those wells, and was present and actually in charge at the time of the boring, working under my instructions, for the city. There was several draughtsmen who worked on this map; it was apportioned, and we had several working at it. Mr. Marsh had supervision of the work. Mr. Burr did most of the work. Mr. Marsh had the actual superintendence of the draughtsmen at the time they were making it, and was present, and he completed this map, the one here present, himself. He is the deputy city engineer. Those cross-section pictures which were introduced here are simply
723 pictures which show the grade of the saturation plane, and they are not supposed to show the exact number of rocks in the ground, nor the place where each rock occurs, or where each pocket of clay occurs; and I didn't assume in preparing them, that there are not many other rocks or many other pockets of clay.

Recross-examination.

By Mr. CHAPMAN:

Among other things, I directed by whom the wells were to be bored; I employed the men. I have not learned since the adjournment who it was that did the actual boring; I intended to do so, but I had so many other matters to attend to that it escaped my memory. Still, I can send to the office, if it is necessary, and find

out in a very short time. I don't think I would know the names if I should hear them. I believe I do remember the name Putney; I remember there was a man by the name of Putney. I had three outfits employed. I can't recall the names of the other two. I directed the two-foot contours to be made from the well-borings; I didn't say how many feet apart in horizontal distance; that is regulated by the vertical distance. I have put both the horizontal and vertical scale on those pictures that I had here before lunch.

BURR BASSELL recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I am familiar with these three maps, Plaintiff's Exhibits 15, 16 and 17. They represent the cross-sections along the lines of which we bored certain wells, showing the formation of the ground and the water plane beneath the surface on those lines. My profession is civil engineer; I have practiced the profession twelve years. I have been at work more or less for the city of Los Angeles on the work involved in this proposed headworks system, from its
724 inception, I believe. I first worked for the city on this in '92–3, and I have worked almost constantly ever since. I have been working for the city recently. I had immediate charge of the boring of the wells which are delineated on the profile, excepting those that the defendants put in, those of Pomeroy and Hooker. On these deeper and larger wells I had charge of the borings. I kept a record of those borings; the field books are in the engineer's office. I have examined those profiles; as far as my information and belief goes, I believe those profiles state accurately the information which they purport to state, and correctly delineate the data obtained in the field. Take the "block line A," the first well. The small figures at the bottom indicate the depth of the well. I think there was a clay strata two feet in depth at the bottom of the first well, marked "clay." If I had my book here for reference I could verify each well there as called upon. I have the numbers of them and I think it would be well to send for them. I have them all numbered, myself. I believe the statements upon this profile, as they appear to state the different strata, found at different depth, and as they appear to show the water plane, are correct.

Mr. CHAPMAN: We object to it upon the ground that it is incompetent.

The COURT: Objection sustained.

Witness resumes: I can't state absolutely whether or not they are correct; not all of them. I have verified some—no section, perhaps, complete. I will go right down now and get my book and verify these wells.

FRED EATON, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My profession is civil engineer. I have practiced the profession about twenty years; have lived in the city of Los Angeles
725 forty years; am forty years old. I have been familiar with the Los Angeles river and the surroundings of that river since '71. I was in the employ of the water company, and commenced about the latter end of '71, and remained with them for twelve years. During that time I had occasion to be on the river more or less all the time. In '71 I was retained by the water company as an apprentice; I was subsequently superintendent and engineer for about seven years, and during that time I was frequently upon the Los Angeles river. I was along the river a great deal, not so much up there, as at a point lower down, but I used to go up there a great deal. I have been familiar with the summer flow of the Los Angeles river during all that time. There is not any material difference during the year, or from year to year, in the normal flow of the Los Angeles river. There is a slight variation, but it is not material. I have observed the river after and during what has been known as dry years in this country. A dry year, nor a summer following a dry winter, has not an appreciable effect upon the surface flow of the Los Angeles river. The summer flow during the summer following a very wet year, is not appreciably greater or less in the Los Angeles river. That indicates, to my mind, as an engineer, that the supply of the river is from a source that is yielding off a very uniform flow. The thing that regulates the Los Angeles river is a deposit of gravel in the valley that the river is supplied from, and if that gravel was of a very large capacity, the excessive rains would fill it up, and it would necessarily make a variable flow in the normal flow in the stream; that is, after a very wet winter, it must follow that the flow would be greater. I know the watershed from which the Los Angeles river takes its source of supply; in my opinion it is about 480 miles in area, above this point. It is estimated a little bit different; but twenty or thirty
726 miles different one way or the other. I believe the highest I have heard it estimated is about 488 square miles; and I have heard it estimated as low as 460. In that neighborhood; within a mile or so of that. The map which has been introduced here was made from a report of the State engineer, which, I think, estimated it at 457 or 459 miles. I have some observations that I have obtained, of rainfalls that have been taken in the valley at San Fernando and the Van Nuys' ranch, and at Newhall. I have informed myself, as far as possible, as to that rainfall—I have a table. Some of this was compiled from the Signal Service, and some of it obtained from the Southern Pacific railroad, and also some of it from Mr. Van Nuys, who has kept a record since 1880. And this table that I have was compiled by the city engineer; it is a table that was prepared from all the reliable sources that we could obtain any information from. I don't think there are any others;

I never heard of any. We found that the rainfall was kept at San Fernando, Los Angeles, Newhall, Ravenna and Van Nuys' home ranch. The first year's rainfall in Los Angeles that I was able to get was 1880; that was 18.6. The rainfall the same year at the Van Nuys ranch was 11.46, and San Fernando, 12.63; Newhall, 13.30; Ravenna, 7.94. In 1881, Los Angeles, 5.60; Newhall, 8.23; Ravenna, 3.36; San Fernando, 5.30; Van Nuys' home place, 3.45; That is the lowest rainfall of which any record has ever been kept. That is the lowest that this list shows that occurred from 1880 to 1894. In 1882, there was 7 inches Los Angeles; Newhall, 9.79; Ravenna, 7.48; San Fernando, 8.15; Van Nuys' home ranch, 9.04. 1883 was 14.20, Los Angeles; Newhall, 13.76; Ravenna, 6.79; San Fernando, 11.50; Van Nuys', 13.25. '84, Los Angeles, 40.50; Newhall, 44.20; Ravenna, 28.09; San Fernando, 27.02; Van
727 Nuys', 33.62. That is the greatest rainfall at Los Angeles, but not at San Fernando; the greatest rainfall occurred at San Fernando in 1889.

That was 33.21 inches. '85, Los Angeles, 10.60; Newhall, 13.63; Ravenna, 7.70; San Fernando, 11.70; Van Nuys', 15.54. '86, Los Angeles, 17.20; Newhall, 14.37; Ravenna, 14.02; San Fernando, 15.53; Van Nuys', 14.23. '87, Los Angeles, 16.40; Newhall, 21.01; Ravenna, 14.38; San Fernando, 14.10; Van Nuys' home ranch, 21.09. '88, Los Angeles, 20.90; Newhall, 22.18; Ravenna, 12.58; San Fernando, 18.11; Van Nuys', 16.94. '89, Los Angeles, 33.30; Newhall, 34.07; Ravenna, 21.71; San Fernando, 33.21; Van Nuys', 30.02. 1890, Los Angeles, 12.60; Newhall, 14.10; Ravenna, 8.8; San Fernando, 10.90; Van Nuys' home place, 7.64. '91, Los Angeles, 12.90; Newhall, 15.35; Ravenna, 8.96; San Fernando, 10.94; Van Nuys', 9.64. '92, Los Angeles, 18.72; Newhall, 19.73; Ravenna—this is quite indistinct, I can't read it. I think it is 8.45; San Fernando, 13.92; Van Nuys', 14.20. 1893, Los Angeles, 21.90; Newhall, 18.48; Ravenna, 11.59; San Fernando, 16.75; Van Nuys', 15.21. 1894, Los Angeles, 7.51; Newhall, -0.96; Ravenna, 8.15; San Fernando, 8.35; Van Nuys', 7.40. Those are the rainfalls obtained from the best data that can be procured, in my opinion. From that I made an average rainfall for these localities. The mean for Los Angeles is 17.44; Newhall, 18.21; Ravenna, 11.28; San Fernando, 15.21; Van Nuys', 14.85. Ravenna is further up in the mountains. It is over on the other side of the shed, on the north side of this shed. It is outside of this shed. It is very much higher than any of these other points; it is 2,358 feet. It is over a thousand feet higher than any other point in the list. It is about 1,300 feet higher than San Fernando; it is 1,065 at San Fernando; 770 feet at Van Nuys', and 1,268 at Newhall. The elevation is not given at Los Angeles. Ravenna is so situated as to be protected from
728 the saturated wind currents. The saturated air is pretty well absorbed by the time it reaches Ravenna. I think that is one of the principal causes of the rainfall being lower there than it is at any other place, notwithstanding the fact it is so much higher. I can't assign any other reason but that fact. In making my estimates regarding this watershed I have figured it and classi-

fied it into mountain shed, foot-hill shed and valley shed. I followed the same classification that Mr. Lippincott did, for the defendants, the same line of classification. I think I used about the same area also; it won't vary much. I made my estimate on 179 square miles of mountain shed, 127 square miles of foot-hill shed and 182 miles of valley; and I find in that 182 miles of valley I included a little piece of valley down below this point. But my estimate practically eliminates any yield of rainfall from the valley—I haven't taken the trouble to correct it. It is a small matter. It would tend to make my figures higher, anyway. I have taken an average of rainfall on the valley portion of this watershed at 15 inches. That is about a mean of what falls at San Fernando and Van Nuys.' I think it is the same estimate that Mr. Lippincott made for that. I placed an estimate upon the foot-hill portion at 18 inches. I took his rule for figures of rainfall for elevation, which I find from other rules laid down for regulating that increase I followed the same rule that Mr. Lippincott did for increasing the rainfall by six-tenths for each hundred feet of rise. Only I started my basis from the rainfall in the valley. He started his basis from the Los Angeles rainfall, which makes considerable difference. I assume that the basis is the proper one from the gauges that we have in the valley, in the immediate vicinity. Those valley sheds with that rainfall yield practically nothing. I have made it a small quantity, 160 inches. The 15 inches of average which falls upon the valley portion, in my opinion, is most always absorbed by
729 vegetation and evaporation. That is true in all cases. You never can figure on any yield from a shed of that kind. That plant life and evaporation will take up about that amount of water. I do not consider the valley portion as available for the purpose of furnishing water for development and distribution, not from the rainfall that falls on that valley itself—of the valley area. The water that flows under ground, in my opinion, at the land sought to be condemned, is the surplus waters that run off of those mountains and drain into that valley. There is the Pacoima and the Little Tejunga and the Big Tejunga; and then these foot-hills around the valley—that's a considerable area there. They don't yield, of course, as much as the other mountains, because they are not so high. The only accounts allow an 18-inch rainfall for that portion of the mountains—we call them foot-hills. I made the foot-hills amount to 127 square miles in area.

The COURT: You didn't ask him, Mr. Dunn, the average rainfall of the mountain region.

Mr. DUNN: Well, he followed Mr. Lippincott's figures, he said, closely.

The COURT: It is not the same, he said.

The WITNESS: No, I didn't follow his figures in estimating the mountain, for the reason that he starts from Los Angeles. Los Angeles is about 250 or 300 feet above sea level, and the average elevation which he assumes to take for the mountain shed is 2,700 feet which I accept also. Applying six-tenths to that, that would be—we will say 300 here from 27, would be 21; and six-tenths of that would be

about 17 inches, which, added to the 17 here, would make it 34; whilst you have got to commence from a basis that's a thousand feet elevation at San Fernando. And commencing from that point and increasing—your six-tenths, you would only have an increase on 1,700 feet, I take the average; in order to calculate
730 that mountain basin there, I take Newhall and San Fernando and Van Nuys', and I take an average of them, and I call it 17 inches. Six-tenths on 1,700 feet, would make it 27 inches for the whole mountain. I didn't take into consideration any effect that the—causes which make low rainfall at Ravenna might have had on this rainshed. It's something on which we have no data, and I wouldn't therefore consider it. I took this as a basis, now to calculate the run-off from that shed. When the waters which supply the Los Angeles river leave this high mountain portion of the shed, they take a southerly direction until they strike these lands that we propose to condemn, and then they take an easterly direction, running easterly through the lands. When they come out of the various canyons they are running in a pretty nearly westerly direction and directly toward the main part of the valley; as they discharge from the canyon they discharge from the mountains in a westerly direction, and just as soon as they get out of the canyon they deflect suddenly and turn to the south. They deflect suddenly there because that country to the west is practically a level stretch, straight across parallel with that map in an east and west direction. It is about a level, and the greatest inclination, of course, is toward the south which is very considerable, and it's quite natural that these waters should take the greatest inclination. The greatest inclination follows the direction of these washes laid down on this map, and under other circumstances the stream would naturally have gone out that way, if the inclination had been greater and no obstructions, of course, to divert it otherwise. The natural grade of the land takes it down directly towards the land sought to be condemned. I took Mr. Lippincott's rainfal., and from that I obtained 6,993 inches, constant flow under four-inch pressure that this watershed yields to the normal flow of the river, which of course I have stated is in excess; it was figured
731 from an erroneous basis—for the increase. The rainfall that I assumed should be the correct one, to make an estimate on, gives a run-off of 4,638 inches, which would represent the normal flow of that river, under ground and on the surface, running 365 days in the year. That includes the surface and underflow of the river. In my opinion, that is the amount of water that is flowing on the surface and under ground and discharging itself through this neck of land. I think that fully and a little more than covers it—fully covers it. There's about 2,500 inches, by actual measurement, flowing on the surface, in time of normal flow. That would leave say 2,100 inches flowing under ground. And in my opinion that 2,100 inches will cover all the water which is flowing under ground and discharging itself, in short, out of the neck and from this watershed. In making this estimate I took the Arrowhead—the actual measurements in the Arrowhead shed; that is, the run-off, and then

I took the usual method, which I have employed in making these calculations roughly, and which is employed considerably—that is a third loss, a third evaporated and a third storm water. I found that it plotted—that it is, the mean—between those was what had been observed from the run-offs by the geological surveys of the arid district; and from that there's a curve been plotted called the Newell curve. I found that was about a mean between the two, and as the Arrowhead was somewhat similar to this shed I accepted that as a basis to figure from. Now we find from experiments made of run-offs in this State, and actual measurements of run-offs that there is about, anywheres from 75 to 90 per cent. of this run-off carries at the abnormal flow—that is, of the balance, would represent the normal flow of the stream, and as the normal flow is the only thing that you can depend upon as supplying the Los Angeles river, there being no storage facilities that we can avail of, that
732 represents the capacity of that river, and you have to take that as the flow of that river—normal flow and yield from this shed. By abnormal flow I mean the flow at the time of storm—storm water that runs away. There's no reservoir sites to catch it and it is simply wasted. That would be simply lost and of no value to any one, except the lower lands between here and San Pedro, where it sinks and makes damp places. By normal flow, I mean that flow which is flowing the whole year, the regular flow of the river that you can avail yourself of for use. I don't apply this 80 or 90 per cent.—75 or 90 per cent. of this run-off, because there's some gravel beds in between the discharge from this mountain shed and the river bed that intercept considerable of this storm water and hold it back and let it off by degrees. That's what regulates the uniform flow of the river. I have allowed 25 per cent. of this—on account of that, as being absorbed by that bed, between the discharge point from the mountains and the river. These storm waters flowing over the surface of these gravel beds will be absorbed—a great deal of it will be absorbed, and I have allowed about 25 per cent. of that being absorbed by these beds. It's my opinion, that between the point where these waters are discharged in the canyon, and the land sought to be condemned, where more surface water rises, there are gravel and sand beds, which absorb a great portion of this water, or considerable of it, and let it out gradually into the river. For that I allowed 25 per cent. of that, which makes 60 per cent. of this run-off which is wasted, at this rainfall which we figure on, leaving 40 per cent. as available for the net discharge. It represents the discharge that makes up the river in its normal flow, and the only one that we can count on for any use. And that 40 per cent. of available flow on the surface and under the ground equals 4,600 and some odd miners' inches, and the remainder,
733 2,100 inches, flows under ground. I heard the testimony of Mr. Friel and Mr. Newman and of Mr. Finkle, regarding the amount of water which flowed under ground at these points, and I heard their testimony as to the amount of the material under ground which was water, and as to the percentage of water in the material. I know the width on the surface of the valley, approxi-

mately, opposite the land sought to be condemned. Of course I don't know where the bed rock is there. There's been a well bored by the defendants which found water-bearing gravel from the surface down to a depth of 123 feet. The well was bored, I understood, about 200 feet; below that they reported dry. Of course how far that depth extends I don't know. I have figured cross-section of the valley at that point 123 feet deep, the depth to which they had water. Whatever is there—whatever cross-section is there, it covers it—I presume it covers it all. There may be water standing in there perfectly stagnant. I should say there was—that there is places in that cross-section where there isn't a movement of a foot a year, some of it. There's other places where it's running quite rapidly. All the water which discharges itself from that watershed has to come down through the same watershed further down toward the Southern Pacific Railroad bridge; it all passes down between the hills. There is no other place for the discharge. I am familiar with the cross-section of that river further down; we have made investigations recently, sufficient to enable me to approximate about what the cross-section between the bed rock and the surface of the saturated plane at that point would be. There is a place down below where the neck between the rock mountains on either side is very much less; from borings thus far made we can safely say that 200,000 square feet will approximate that area; the channel at this section between the rock mountains, on the satu-
734 rated plane, will be in the neighborhood of—between 3,500 and 3,700 feet wide; it's considerably less than a mile across; that has been bored for the purpose of determining how deep it was to bed rock. I was familiar with that cross-section before this time. In the immediate vicinity of that cross-section and at practically the same place, there were borings made part way across that valley, in 1879, I think, or 1877, I think it was—by the city. Mr. Kelleher was city engineer at the time. Recently, within the last ten days, borings have been made for the city of that cross-section at practically the same place; they are still boring. These borings have proceeded far enough to say that 200,000 feet would be an approximate estimate of the area of that cross-section. Those borings have struck bed rock; there's been four wells struck bed rock; every well that has been bored has struck bed rock. I am accepting this statement as correct from the data that's furnished me. I have been there myself and saw one well that satisfied me that it was bed rock. But I have-'t been there since the others struck bed rock. I was the person who knew and discovered this original data, and made it into the shape of a profile during the time I was working for the city. I suggested the present borings that are being made and have been made; the city engineer has charge of it. I have given the matter some attention. I believe the balance of the wells have struck bed rock, at an average of 50 feet; 50 feet and 4,000 feet wide, that makes 200,000 square feet. I believe that this is a fair cross-section at that place; I think it will turn out less than that. That is an absolute basin, the sides of which are rock, and the bottom of which is rock.

The COURT: Mr. Dunn, do you intend to lead your witness all the way through?

Mr. CHAPMAN: Yes, sir; that is what he is going to do, evidently.

735 Mr. DUNN: If I can, your honor, I would like to, but it is not necessary.

The COURT: You will have the satisfaction of probably avoiding the objection pretty soon, if you will try to examine him the other way.

Witness resumes (after discussion): I observed the material from all the wells that were being bored at this lower cross-section, and there were three that were being bored at the time that I made my investigation. The lower cross-section would mainly be of a material that I would call coarse sand; there were occasionally a little gravel stone or boulders—but very little of that compared with the balance; and once in a while you would find a little fine sand. I would say it was coarse sand—a coarse-sand cross-section. All the water of this shed that isn't absorbed by the bed rock must go through that cross-section. The velocity of the underground water at that point is a very difficult thing to arrive at. The data that we have, that we can gather, on water flowing through sand—if that water was flowing through uniformly there it would give a ridiculously low amount. Lower than I am satisfied is flowing through there. Now, we have an area of the river bottom on this land that we are seeking to condemn, and I believe Mr. Friel testified it's something like eleven acres; and I have scaled it to make just an approximate estimate—average width—and that's about what it figures out. We have an actual measurement of the increase of water in that river between the points, including this area. There's something like an increase, in the length of that land, an increase of 1,300 inches, but all of that isn't rising immediately in this bed. There is some streams coming in on the sides, and I put it at an approximate of about a thousand inches, as coming up out of the bed. Well, if we take that as a guide to determine about how fast the water would pass through that sand, if it is passing through uniformly—of course, it's not, because

736 you can see the water boiling up in places along; but we would estimate that it is passing through uniformly; why, it would give up a velocity of a half—less than a half a foot an hour. Now, that's what we get from an actual measurement. Now, that is acting under more favorable conditions than would be down at this lower plane, because all around this river bed the water plane is elevated two or three or four or five feet, and the distance from the bed rock to this elevation is not very much. Therefore the pressure acting upon that bottom through which that water is coming up, is far greater than it would possibly be in passing through a section of a grade of a foot in a hundred, or six inches in a hundred—which this lower one doesn't have that. It doesn't—probably over three or four inches in a hundred, which would represent the head acting through a hundred feet. And if the head that was acting on this was only a hundred feet from that, that

would be acting under eight or ten times as much head as this cross-section would have. So you see that the velocity in that lower cross-section would probably be less than that. But even that—we having 500 and—well, eleven acres is about, say, 4,700 feet; over twice the area of that cross-section down there that we bored. And if we take that as an index to guide us in estimating what will flow through sand here, that wouldn't flow over four or five hundred inches. Well, that's ridiculously low. There is more water than that, I am certain, that's floating there. I think there's about—well, my opinion—without anything particular to substantiate it, I would say it was—it was a half or a third of what was flowing there, and it's about a fourth of what we estimate. Taking all the figures and data which I can procure, for flowing through sand, as a basis or guide to figure on, I say that the flow through this lower cross-section where it's all got to come through, providing it were all of this same
737 character and uniform all the way through, would only be about 500 inches. But I have figured that the underground flow is about 2,100 inches. I don't think that that water is coming up—certainly not coming up uniformly through there. That we can see. We can see it boiling up in places, and other places you can't. It's not possible, and that water is probably coming up under—instead of coming up out of eleven acres, it is probably coming out of a third of that, maybe. There are places where you can see nice little streams running out, and other places where you can't observe any water coming out. It is my opinion from that, that the water underflow through this cross-section is not flowing uniformly. My opinion would be that the amount of water flowing through that cross-section would probably be, 1,500 inches, say; something like that. The river shows an increase down at this cross-section I am talking about now, between the Hooker land and this cross-section, there is an increase of a thousand inches in the river, practically—within thirty or forty inches of it. Now, I estimate that the Verdugo shed is yielding about 750 inches, the Verdugo water shed, which also includes the valley shed. You will see from the other map—you can tell better from the other map. The Verdugo shed comes in below this land. Taking that piece in there below the land and the Verdugo—there's about 75 acres, I think. I figure about 750 inches as the available flow from that—the water crop. A portion of the increase in the river comes from there, and the balance comes from the underflow. It must. There is no other source of supplying it. It's thrown up by this narrowing of this cross-section and the reduction of the grade. The underflow is passing through the Hooker land. (Witness goes to map.) This lower cross-section is approximately where I have marked heavy pencil mark on this map, and is about a mile inside the city limits. The cross-
738 section which is just being prepared now, receives also the discharge from the Verdugo watershed, and the land lying between that point and the Hooker land, or below the Hooker land. I took the diversions from the Los Angeles river at several points

into consideration in this estimate. The first diversion is made at what we call the main supply ditch; that's on this land that we are seeking to condemn now. They divert about 900 inches there in the summer. They made, or they think—they call it about 700 inches they get away from the river with. The ditch is very leaky along there, and there's a couple of hundred inches waste before they can get away from the river. The water company divert on the surface about five or six hundred inches, I should say. I can give the actual measurement of it if you desire, that they were diverting on the 19th. On the 19th of March, of this year, there was diverted in the main supply ditch 750 inches—the water company 546. The surface of the diversion and the underflow was 700, and at the—near the southeastern boundary of the Hooker ranch, the river was flowing 1,823 inches, making a total of 3,819 inches of water above the water company's ditch, above the—now the river at the lower borings was 2,830, making an increase of 989. Then there's two small ditches that divert water in the summer time. One is called the Chavez and the other the Feliz ditch. They divert about 200 inches, the two of them. The average diversion in the Zanja Madre and Zanja 6–1 is about 1,500 inches. They run a little over that possibly, both together, and they are diverting now about—at the lower diversion point, which is at the Macy Street bridge, about seven or eight hundred inches. They enlarged that ditch since I piped it; they put in some double pipe; so it has a capacity now about 800 inches. Of course when that 800 inches of diversion is made out of there there is no surface in the river at all flowing down.

739 Altogether there is about 800 cubic feet a second, or 4,000 inches that is flowing down. That includes everything that is taken out and everything that flows on the surface, and all its sources; includes the Arroyo Seco; the Arroyo Seco watershed, Verdugo watershed and the land below these headworks. That figure also includes all the water that is taken out clear down to the Macy Street bridge. Now, when there is less diversion being made for that, there is water passing below Aliso street, and also there is diversions taken out by the Ames ditch and others down below the city. And when these diversions I speak of are in operation to the extent that I stated—there is no water runs down there. Supposing these headworks were to be constructed on the general plan proposed by this map, Plaintiff's Exhibit 14, of tunnels and filtration galleries, I couldn't tell you how much of the underground water would be collected; there would be some underground water collected, sure, because you reduce the section that the water is now passing through under ground, but you would reduce the river below that much. Whatever you take out there is necessary to maintain the surface flow below. No developments can be made there without diminishing the river below. The water that I would take out under ground here would diminish the flow of the river, in my opinion, further down, just simply by an increase of diversion at this point. All the water that's flowing down this river is necessary to maintain the surface flow. All the water that's flowing under ground is necessary to

maintain the surface flow at all points, because it's nothing but a sandy bed. The water can pass through all of it and any of it—and up and down. And if you take it from below you will move it from under the river—it's bound to drop down through the sand. We have evidence of it right on the river. If this underground system of tunnels and filtration galleries
740 were to be constructed, and water taken out through it, it would, of course, affect the surface flow of the Los Angeles river, on the land itself and below. Whatever it affected it here it would reduce the surface flow below. If the improvement the city proposes to make should increase the quantity diverted at this point a thousand inches, why there would be a thousand inches less water flowing on the surface somewhere along the line of the river below; and if the water is taken out under ground at this point, water to the same quantity will disappear from the surface flow at some point, in my opinion. There is a direct connection, in my opinion, between the water which flows upon the surface and the water which flows under the ground, through the land sought to be condemned. It's solid water from the surface to—as far as we have bored down, with the exception of a few places where little pockets of clay were found. Wherever they were found of course they divided it, but that was only local. If it's solid water from the surface of the—water on the ground down as far as we have gone to find water, why, it must be the same water. It all comes from the same source. At one time it's all mingled up together—at least, part of it. If you drain the land dry under the surface flow, the surface flow would drop down to take the place of these voids that are created by the subtraction of the water below. Gravity would naturally take it down. It's this water in the saturation, in the sand under it, that sustains the surface flow, on the surface. I consider all the waters that are flowing on the surface and under that surface, that are necessary to maintain it, constitute the waters of the Los Angeles river. Without the underflow you could not have a surface flow. That underflow must be sufficient to fill those voids up, or it will flow from the surface down until those voids are filled.

741 Cross-examination:

By Mr. CHAPMAN: By solid water, from the surface down to the depth of wells bored, I mean, water in contact. Water must be solid if it's in contact. Of course, there is a lot of sand mixed with it there, to the extent of possibly two-thirds in volume, not at all points, I think it's quite variable. You will find some places where it's—don't have that proportion, and other places where it will have a greater proportion. You will find it in a less proportion in fine sand; you will find it in clay. I should imagine that the material that we would call sand there, coarse sand, would have say, thirty or thirty-three and a third per cent.—30 per cent. say of voids. The fine gravel which was free from sand would have possibly—might have as much as 40; 38 or 40. The finer sand that is very fine, might not have over 16—18 per cent. Maybe 22 or 23 per

cent. There is quite a variance in the percentage of voids in the different character of material that's been taken out of there. I was not present at the boring of any of these wells that were bored on this Pomeroy and Hooker tract, but I observed the material in several wells that was taken out, after they were bored. I rode all over the land; I didn't ride all over Pomeroy and Hooker's land, but I rode pretty well over the land where these—or most of the wells were being bored to the north. I have been pretty near all over Pomeroy and Hooker's land. But most of the wells were bored on the land to the north. And I saw materials from quite a number of those wells; several of them. Here's a map of the valley; we can easily ascertain the space of the valley which the wells that I examined cover. Exhibit No. 14, scale 200 feet to the inch. There's about 33 inches across there; that would be 6,600 feet,
east and west along Verdugo avenue. One, two—there's
742 about 24; that would be 48. About, say, a mile wide north
and south, would cover the extent. I was up through what is called the Pirtle development. It commences somewhere near the corner of the land, the lower edge of the—end of the cut, and extends, I should say, in a northwest direction. The cut zigzags all over. It runs all parts of the compass. But the general direction would be northwest, I should say. It must be about 3,300 or 3,400 feet. The material that has been discovered in those various wells and cuts is not the same all through there. That Pirtle cut, there was lots of coarse gravel in there. Some of these wells show gravel quite free from sand. I believe they do, pretty near all of them, show gravel, more or less. They all show sand, and pretty nearly all of them some clay. The material that is brought to light by those excavations and wells is practically the same throughout that whole extent of country, differing perhaps a little in the proportion of the quantity of gravel and coarse sand and fine sand and clay in different parts, but the material is practically the same, as far as I have observed on this map—I have made observations further up the valley at other times. Water is found in all those wells at about 15 or 20 feet I should say. These are profiles of the wells: they vary; block line A is an average. Well, I should say that it would average 15 feet on line A. These wells don't show a depth of over 15 feet below the water plane—about 30 feet below the water surface. Some of them are comparatively shallow wells—one here 40, but it's very likely here that this same—that this deposit of a similar character, if not the same occurred further down. There was a well sunk by the defendants, which we have a map of here, showing 123 feet of water! I don't know anything about the one sunk by Mr. Pirtle. I have known the river pretty intimately for
a long time. I was engineer and superintendent for the
743 city water company about, I should say, seven or eight
years, and city engineer four years. I paid considerable attention to the Los Angeles river during the time I was city engineer. Not so much as I did when I was with the water company, because all my work was on the river then. I say there is no material variation in the flow of the Los Angeles river since I have known it.

0, there's materially—probably 10 per cent., or five per cent. once in a while; probably 5; say 5 per cent. I don't believe it would run over that. I am not speaking now of an extraordinary flood season or an extraordinary drouth, but the ordinary flow from year to year, the normal flow the year through, winter and summer. When the flood affects this flow it is only for a short time, above the lower cross-section; the flood waters affect it for a long time below the Arroyo Seco, but above the Arroyo Seco they are affected for a very short time. I have seen 5,000 inches, a hundred cubic feet, run down the Arroyo Seco, and I have seen a couple of thousand inches running down there for two or three months, and I have seen water running down there all the year round, five hundred to a thousand inches. I have seen it—quite a number of years ago; I wouldn't say what year it was. I won't say since I left the water company's employ; that was, I think, about 1883. Prior to that. But since then—I can remember—I was city engineer—that that water was running in a large volume for a good while. I believe the flow of the Los Angeles river is greater at the lower end of the Hooker land than it was formerly; but the river has been cut out about six or seven feet there, and it's due to that fact. I don't know as the flow of the river in its ordinary stages in the summer season below the Hooker land and down to the city limits is greater now that it was twenty years ago. There's more waste water. The increase of the waste water—there's been an increase in the waste water
744 of the river. There's been water flown down past Macy street, but that was due to—something I did myself, and that was to reduce the size of the conduit in Zanja Madre. It formerly had a capacity of 500 inches more than it has now. I don't believe there is very much difference—take the river as a whole—between the water flowing in the Los Angeles river, ordinarily in the summer season, now, and what there was twenty years ago; but there has been an increase in the water that has passed Macy street; and I can remember a time when there was no water passed Aliso street at all, and I have observed water passing there of recent years a great deal. A person might judge from that that the water had materially increased.

Possibly it might have increased two or three hundred inches. There has been a good deal of cultivation up there in the last twenty years. That might have some influence on it. And it is a fact that there has been an increase in the cultivation up in the San Fernando valley, within the last twenty years, but the increase has not been material. I am estimating the watershed at about 480 square miles, and of this 480 square miles I put in the valley portion 182 square miles, and according to my estimate the average rainfall upon that portion of the land is 15 inches. Expressed in miners' inches, or water measured under a four-inch pressure, constant flow, 15 inches of rain water on that kind of a shed wouldn't yield hardly anything. That supply, if it were gathered together in some manner that it should flow for a year, and none of it waste, with a shed of 182 square miles, would yield in round numbers 10,000 inches. And that, in this calculation that I am making

about the underflow, I take no cognizance of at all. Oh, I allowed 160 miners' inches, and the balance of it goes to evaporation, wholly. It is practically all lost by evaporation and plant growth, of course. The proportion that goed for evapo-
745 ration and plant life, is a variable quantity. Of course it depends a great deal on how the rain falls. The rain falling mildly on this land, distributed over a great space, would be an immense amount of evaporation—an immense amount of time, I mean, the evaporation would be very great. The ground would never get a chance to become saturated. I will give you exactly what I have allowed for evaporation, and what for plant life. The run-off. Well, I have taken the run-off amounts to half an inch. Now in this run-off occurs on a place of that kind, it is a sudden—caused by a sudden dash; a big shower, and I follow the same rule as I do on the mountain shed, of 40 per cent. available. A run-off of half an inch, would be equivalent to a sheet of water all over that half an inch deep. And there is six-tenths of that would be storm water, that you wouldn't avail of, that would occur during the rains.

Q. What I want to get at is the disposition of this 10,000 inches. We have got 160 inches which you allow to increase the underflow. That leaves 9,840 inches on hand.

Mr. DUNN: He didn't say he allowed it to increase the underground flow. He said he allowed it as run-off.

The COURT: 8,840.

A. That ain't run-off. That has gone in plant life and evaporation. Part of it has gone in run-off; a very small portion of it.

Mr. CHAPMAN: The way I figure it, it leaves it 9,840; 160 inches from 10,000 inches.

The COURT: Oh, I thought he said 1,600 inches.

Mr. CHAPMAN: No, sir.

A. Well, I say an amount equal to 200 inches, we will say.

Q. Is what?

A. Of that would be lost storm water.

Q. Surface run-off?

A. Wasted. Not available.

746 Q. Yes, sir. That leaves us, then, 9,800 inches.

A. Well, then, 160 from that.

Q. Sir?

A. 160 from that.

Q. For what?

A. From the 800.

Q. I know, but for what?

A. That is the available run-off. That is what you get; a steady normal flow of 160 inches.

The COURT: He has already counted that. Go on to something else.

Witness resumes: The balance is lost from evaporation and plant life; to sustain plant life. I have made an estimate of how much

for the one and how much for the other; I have given you about 200 inches; it would be about 200 inches lost in storms that can't be availed of. The water crop would be 160 inches, normal flow from that, all the year around; and the balance is wasted to plant life and evaporation. I didn't estimate as to how much of that 9,640 that is yet to be accounted for goes in evaporation, and how much goes to support plant life—take a 12-inch rainfall, it will be all absorbed and nothing run off, of a 12-inch rainfall. I don't make any calculation as to how much was absorbed by plant life and how much went off in the air; it is all gone. I just lumped it together. If that shed was up on a mountain, with precipitous sides, I would figure it differently. There would be a yield there. I have disposed of 200 inches of the 10,000 inches of water falling on this valley watershed, of 182 square miles, by the surface run-off; that is lost for all available purposes. I have never made any estimate, nor have I any opinion, as to how much of the 9,640 inches of water is taken by evaporation, and how much of it is taken by plant life, that is so variable. There is several things that control the percentage of evaporation. There is temperature controls. It depends on how the rain falls. You take 12 inches of rainfall and dash it all on the ground at once, and there would be a tremendous part of that
747 run-off in the shape of waste storm water; then the quantity from evaporation would not be so great. But you let it fall, as it does here, in these gradual showers, and extending over four or five, or three or four months, and it is held in the surface ground and the winds passing over it, and the change of temperature. This evaporation is going on all the time. Whether evaporation is in proportion to the surface exposed, or to the quantity of the water, depends, of course, on the kind of a shed as I have just said. The surface exposed in a shed like this valley, receiving the water as it does, the evaporation and plant life would get away with the quantity of water. The percentage of evaporation is determined by both the surface exposed and also the quantity of water, and other conditions. Don't confine me down to those things. Surface water doesn't apply to the proposition of evaporation at all. The proportion of evaporation would be just the same on the surface as on another; if they are exposed to the same conditions. If one had ten times the amount of area as the other, there would be ten times the volume lost in that as there would in the other. The fact that one was ten foot deep and the other one foot deep would have no appreciable effect, because the temperature, of course—if you had that water exposed a long time to vary—in a torrid sun, it would make a difference. The one ten feet wouldn't evaporate as fast, because the water would not heat up as hot. The shallow one would heat up hotter and therefore evaporation would be greater. But this is not subject to those kind of conditions. My final conclusion was that the extent of the area of surface does have a very considerable effect upon the amount of evaporation, of course. There is really less of this watershed within this valley part than I have allowed for here. The bottom lands in the San Fernando valley is the portion of the country that

has the greatest plant life to support—the western portion of it
748 has the greatest, or the center and southwestern portion. The whole lands that I include in the valley watershed is precisely that part of it where there is the greatest amount of plant life to be supported of any other separate area in this whole watershed. It has more plant life there than elsewhere. The water that is consumed in that plant life is necessary to the support of its life. If it was not supported by the water it would die. If this water that fell upon the surface of this plain in this valley did not fall there and be consumed in great part, in supporting the plant life, it would have to be supported, if supported at all by the waters which came down from the mountain shed; and a very small part of it would get over in that valley. It would run off to the river. On that map you will see main channels leading from all the principal watersheds. You see those are main channels collecting the water off of those hillsheds. The Los Angeles river runs down here. It is on southern side of this range. The great mass of the rainfall is up in these mountains, and it comes down in a southerly direction through these channels, and I allow about 25 per cent. soakage in each of the channels from where they discharge on the plain to the river. The water coming down off the mountain would soak down into that ground there, and find its way under some of this land—I don't think there is a very large proportion of it, by any means. Because I don't think the tendency of the water passing down through soil in a westerly direction—and it follows, pretty generally, of course, these washes. And the main body of the water which flowing into that river through these channels—some of the channels lying under ground here are pretty close to the surface. There is some waters come down through here. If this water is collected pretty fast—this area here is of a close texture. It is a kind of clay; heavy soil. The water will run over it faster. It
749 is collected into these drains and carried off rapidly to the river. It runs towards the lowest—part of it runs southerly and part of it southeasterly and part of it easterly and part of it northerly. The lowest part of the valley we are considering is the eastern boundary of the Pomeroy and Hooker land. The valley rises pretty steadily, say 50 or 60 feet to the mile, westerly, from Pomeroy and Hooker's land, and it accelerates, that grade accelerates as you go north. You see hills are marked here next to the line of the Verdugo creek. The water slopes there to the southerly or southwesterly. From the Cahuenga range the water doesn't go far into the valley. It is confined in a little channel. The general course of the water is not towards the central portion; towards the southerly end. In my opinion the Cahuenga mountains make the water rise up in the bottom of that river. They form an obstruction to this flow. Otherwise it would flow on through down through the Los Angeles valley. There may be places there where small quantities pass. It doesn't go off in an easterly direction because near the eastern boundary of the Pomeroy and Hooker land the mountains commence to trend in a southerly direction, making about a right-angle bend at that point. I don't know what effect that has; I

couldn't state. The water bubbles up and makes a surface stream there, and then flows off in an easterly direction for a ways, and then turns southerly. These mountains here intercept it and prevent it from going off in that direction before it bubbled up. Of course it meets a mountain there that stops it and that forms a resistance. If it could make its way off to the east easier than to come bubbling up to the surface, it would come out where the least resistance was offered. There is no question about that in my mind. And it comes out underneath there because it is easier to lift the water up through the pressure
750 that is present there by that range of mountains, than it is for it to flow off down the other way, until it reaches a certain height. I know the water moving south meets with the Cahuenga range there; it operates as a kind of a dam; the water raises at this point just as it would behind any other dam; and when that water plane has reached a height where it can make its way off in some other direction easier than it can be lifted any further, it would go. On the surface or underneath, it would go where there is the least resistance. If I put the tunnel under there and tapped that stream to the extent of a thousand inches of water, and intercepted these percolating waters to the extent of one thousand inches of water, I think it will affect the flow of the Los Angeles river there. I am quite positive of that. I don't say we are going to get a thousand inches out there. If you had a reservoir capable of holding ten million gallons of water, perfectly impervious to water, and twenty feet high; and you turn a stream of water in there of a thousand inches, measured under a four-inch pressure, it would fill that reservoir full, if the head was high enough, and it would run over it. If I had a pipe inserted in there which, when the reservoir was full, was capable of discharging 500 inches of water under that pressure of 20 feet in height, there would be 500 inches flowing over the top of the reservoir; and it would flow over just the same as it would before I put the pipe there. If I put another one in that was capable of flowing just another 500 inches, so that the exhaust was exactly equal to the supply, that reservoir would stand full, but it wouldn't be yielding anything. It would not be yielding the thousand inches; the stream running in is what is yielding; the water would stand there on the level; that would be merely a little expansion in the pipe, that is all. The expansion yields nothing; if you let in just
751 as much as you let out, the expansion don't mean anything.

If there was just as much ran in as ran out and the reservoir was full when you started, it would stand at a level. If I were to add anything to the exhaust and make the exhaust exceed the supply I would soon lower the water plane and empty that reservoir. If the Los Angeles river is carrying off 2,000 inches at the lowest end of their tract and that is by an upper pressure from below, and you were to tap that upward pressure—if the upper pressure now makes you exceed the 2,000 inches by 3,000, if you would tap that and take off 1,000 inches it would certainly draw from the river, because the surface flow of the river is supplied from that very underflow. It

must be an underflow first before it is surface flow; and it is supplied because the water can make its way up easier than it can go off the other way. There is a limit to that water that is coming up underneath. I wouldn't care if there was 20,000 inches running under there. The lower that saturation plane there and the quantity of water that you will increase—the quantity of diversion at that point is limited. It is limited to the quantity of water that would be flowing through that piece of section above your drain. Now, if here is a thousand inches running in that way, why, you will get it; and if there is 500 you will get it; and if there isn't any, you won't get any increase. At some points you can see quite a little stream of water bubbling up in the bottom of the Los Angeles river, and at others you don't observe that. That is uniformly the case pretty much all along the stream. There will be an interval of a few feet in which the motion upward is not so very observable; and then, at other points, there will be quite a perceptible motion underneath, the coming up from the bottom. Wherever there is an increase in the river you will generally find water boiling up in places
752 from the bottom. Sometimes it is running in in little streams from the sides, and other places you will see it boiling up in the bottom. That is not the thing which you see simply at one or two places, but all along that whole stretch across this tract you will find, at intervals, this boiling process that is visible, and at other places it isn't. Some places it is very distinct, some the motion is perceptible; at others you don't perceive it. That is the same case with the sides. You will find it running in little streams on the sides in places. Some places none running at all. I saw the cuts that Messrs. Pomeroy and Hooker made. I observed the same appearances there that I do in the river bed, or substantially the same thing, both at the sides and the bottom. That is nothing more than an artificial cut or depression in the saturation plane, as the river is a natural one, and supplied on exactly the same principle that the river is itself; the same water. I paid very close attention to the places where you can see the water trickling down in little streams on the sides of the excavation. I observed some of those in those cuts. I observed the whole length of those cuts minutely, for the purpose of ascertaining what the process was by which the waters got in there. I see they rose up from the bottom and sides.

I was in the employ of the city when I went up there. I saw them raise up from the sides and bottom, and I was there for the purpose of enabling me to testify in this case; went there for that purpose. I observed those cuts very minutely, the bottom and the sides. I don't believe those little streams that come down the sides of those cuts were flowing to the magnitude they do at the discharging point; that is, within the material. But you couldn't see back into the material far enough to distinguish that they were anything else but streams. They were not of a magnitude
753 —they gather as they approach the edge of the stream. They gathered with other little streams that were coming in.

You will find little streams coming out along the sides of the cut where the dirt had sloughed off or tumbled in, also. In some places I would find they had tumbled off and they wer-n't little streams; there are places where you can see it sweating out, and other places where it comes in streams, and other places where it boils up in the bottom. There appeared to be all around the bubbles little fine sand that was thrown out from the interstices of the little channel this water was coming out of. As it approached the surface or bottom of this cut, of course the resistance became less all the time and the velocity greater; sufficiently great to carry this sand up. If I had made an examination where this boiling process was going on, it would not have led me to anything, for the reason that it had been disturbed, the surface, and you could not judge from the surface what was underneath. I am speaking of the cut. You couldn't tell whether the river and the cut are presenting pretty much the same phenomena. I observed one of the places closely in the Pirtle cut; the material. It was gravel in there, and I took a stick and ran down into it about 18 inches. I didn't try that in the river or in the cuts on the land in controversy. Of course the waters under ground concentrate into the portions of this cross-section which offer the least resistance, and flow in channels. The velocities are greater in one place, fifty times, than they are in others. There are velocities in there that don't move a foot a day. Those streams that I observed in this cut and in the river are very small, the little boiling up and the little seeping out of the sides. I noticed some pretty big ones up in the Pirtle cut. I mean where the channels concentrated and formed six or seven miners' inches. I mean little minor
754 channels coming in on the sides; I don't mean the whole channel. Down in these cuts that you have been talking with me about, I saw no such volumes as 123 inches. I went along the 1,600 foot—that is, the lower cut, towards the east end of the ranch. I didn't go all along the other one. I didn't count the streams that I saw flowing in the sixteen-hundred-foot cut, from one end of it to the other, on both sides; there is a whole lot of them. I said applying my principles to the velocity of the water on the lower cross-section I have been speaking of, it would be ridiculously low; fully one-third. It would be one-third or two-thirds or a third or a fourth what I would imagine would run through there. I am not guessing at the number of these streams in one of those cuts, I am taking the actual flow out of this river, that boils up in this river in a given area, to get at my estimate of what is flowing down that cross-section. I never tried to make any estimate of the streams that I saw in the cuts and in the river side, the bank; no object in making an estimate of the quantity of them. On the mountain shed, proper, I have divided that into two classes, one the foot-hill and the other the main source of supply. I took for the foot-hill part an average of 18 inches, and the area of that is 127 square miles of rainfall, 18 inches. I have never made those computations; I didn't know there was any occasion for it. If I had known you would have wanted them I would have had them made out—in round numbers say eighty-five hundred inches; that would be

eighteen inches deep over that surface—8,500 inches under four-inch pressure. That gives me a run-off of 13½ inches; that is the total run-off; that includes storm water and—well, for the crop; all the water that passes off; that is 13½ vertical inches, not miners' inches.

I will give you the final result; the available crop from the
755 foot-hills is a thousand and eighteen inches; that is what makes up the river; and the balance of that 8,500 inches is evaporation and storm water and plant life. The run-off is 13½ inches—60 per cent. That is the total run-off. I haven't got it figured down to miners' inches.

(Extended discussion concerning the matter of sending the jury up to view the premises sought to be condemned, and the appointment of persons to go with them and point out the different objects mentioned in the evidence.)

The COURT: I will appoint Mr. Bassell and Mr. Friel. I think those gentlemen can be relied on to do the right thing. I will give them instructions before the day closes.

Mr. Eaton tells me he inadvertently stated some wrong figures yesterday, and he wants to correct it; go on, Mr. Eaton.

Witness resumes: I gave the increase of the river between the Pomeroy and Hooker land as 989 inches, which is merely a mistake in the manner in which I put the figures down. I find that the flow of the main supply is 750 inches. The same amount as I gave yesterday. And the flow in the river at the east boundary of the Hooker and Pomeroy land is 1,823 inches, making 2,573 inches surface flow of water on the Pomeroy and Hooker lands. Now, at the lower cross-section, the borings that we are making, situated in the city of Los Angeles near the Southern Pacific Railroad bridge crossing the river to the north, the railroad going to San Francisco—the measurement in the river there was 2,830 inches, making a difference of 257 inches. To which is to be added the diversions that were being made at the same time between these two measurements, which are water company diversion underflow, 700 inches, water company's surface diversion 546. Added to 257 makes 1,503 inches as a difference between the flow of the
756 river at Pomeroy and Hooker lands and this lower cross-section mentioned. All these figures correspond with the ones I gave yesterday. I just misplaced them and made a wrong subtraction. 2,830 inches at the lower cross-section near the Southern Pacific bridge. And that makes a difference between the water on the Pomeroy and Hooker land of 257 inches. If the main supply was turned out into the river, there would be 2,573 inches flowing in the river on the Pomeroy and Hooker land. The 2,830 inches down below is the amount actually flowing in the bed of the river at the lower cross-section.

Mr. CHAPMAN: So there shows a gain of 257 inches in that alone.

The COURT: Why isn't it a gain of 1,007 inches?

Mr. CHAPMAN: Because there is 2,573 at the eastern end of Pomeroy and Hooker tract, including the 750 inches in the ditch.

The COURT: But that 750 that is in the ditch there never gets into the river any more, does it?

Q. It is not in the lower cross-section?

A. No.

Q. 1,823 flowing by the eastern end of the Pomeroy and Hooker land, and 2,830 at the lower cross-section, isn't that an increase of 1,007? In the natural flow of the river, I mean. And in addition to that whatever is diverted between the two points.

Witness resumes: Well, now, let's see. There is 750 in the ditch, and 1,823 flowing in the river, making 2,573 inches at the upper point. Now, at the lower point is 2,830 inches, flowing in the bed of the river. If that 750 inches had been running down the river there would have been 3,580. That makes 1,007 inches of actual rise in the water of the river between two points. The city takes out this surface diversion between those two points. You would have to add that 546. That makes 1,503 as the actual rise in the water of the river between the lower end of the Pomeroy and

757 Hooker tract and and the cross-section near the north boundary of the city. My 1,823 inches is at a point near the east boundary of the tract; that is after the 750 inches is taken out. Then at the cross-section there is 2,830 inches in the river bed. That would leave 1,007, the difference between the river measurements; then the city water company takes out 1,246 between those two points; 700 of that is underground diversion; it is all diversion; 546 on the surface, and 700 under ground. I want to get the difference of flow between the Pomeroy and Hooker lands and the lower cross-section; that isn't 2,253 inches; there is 750 that is flowing in that ditch that otherwise would pass over the Pomeroy and Hooker land. It don't go down to the lower cross-section.

Q. But if it was turned in so as to run across the Pomeroy and Hooker tract it would run down across the lower cross-section, and you would have to add it to both places.

A. But that don't give you the increase from the Pomeroy and Hooker lands down to this point, because there is 750 inches in addition that is taken out by this ditch.

Q. Try it now. Add your 750 inches to 1,823.

A. Making 2,573. Now we measure down below, 2,830.

Q. Now, add 750 to that. If you let it run down it would run all the way down.

A. Why add it again?

Q. Why add it at all, I say? If you add it at one end of the stream you would have to add it to the other.

A. Well, figuring it the way the judge figures, it is about 2,200 and odd inches, deducting——

Deduct 750 from 2,253, and it will represent the increase between the Pomeroy and Hooker and the lower point.

The COURT: That is what I don't understand.

Mr. CHAPMAN: I don't understand it, either.

758 Witness resumes: I don't include in the 1,823 inches the 750 inches which is taken out of the ditch. If it was put back

into the river, according to my theory, there would be, at the eastern end of the Pomeroy and Hooker tract, 2,573 inches. Well, now, let's have the ditch on the Pomeroy lands. Let's leave that diversion out, and we will take the two measurements, in the river; now there is 1,823 inches up there on that land, at the eastern end; there is 2,830 in the river down at this cross-section, making 1,007 inches of increase. Now, in between those points there is 1,246 inches diverted by the water company; if that was in the river instead of being diverted, you would add to that 2,830; now suppose we just add that to the 2,830 the water company's diversion, it would make 4,076; now you take 1,823 from that, there would be 2,250 left. Now you have got 750 inches that wasn't flowing at the upper end, which, if you had it, would have been 2,573; which would have made 750 more. That you would have to deduct from this, making 1,503 inches.

By the COURT:

Q. I don't understand yet why if you add the 750 inches at the upper end you wouldn't have to add it also to the amount flowing at the lower end.

A. No, you don't have to do it.

Q. Well, I do.

A. Well, I am satisfied that I am right about it, and I could make it clear if I had——

By Mr. CHAPMAN:

Q. Let's see if we can't get straightened out on what we are trying to calculate. If you have reference now merely to the increase between the eastern boundary of the Pomeroy and Hooker tract and the cross-section, then that portion of the water which is diverted from the river by this main supply ditch, and which is diverted above the eastern boundary of the tract, can be just left out as a false quantity, if you are figuring only on the increase, can't it? Except, possibly some seepage from the ditch that might
759 get back into the river. So that, if you leave it out at both ends, so far as the calculation of the increase is concerned, your calculation is all correct. But, if you put it in at one end, if you are looking for the increase, you have got to put it in at the other. If you leave it out of both or put it in both, the result would be the same, so far as the increase is concerned.

By Mr. VARIEL:

Q. When you measured the 2,830 at the cross-section, was the water from this main supply ditch turned out?

A. No, the water was running in the main supply ditch. There was 750 inches running in the ditch, and 1,823 running in the river.

Witness resumes: The 750 that was in the main supply ditch isn't included in the 2,830. If I turned that into the river at the time I made the calculation that it was 1,823 at the eastern boundary, then, theoretically, at least, there would have been 2,573 inches instead of

1,823. I had 750 in the ditch, and 1,823—let's take all the diversions and see how it comes out. There is 750 diversion up above; that is the supply ditch. And 1,246, the two diversions between; the water company. There is no other diversion. Then we take the 2,830 and add that to it. We have 750 diversion at the upper point, and 1,246 by the water company. After those diversions are made we measured 2,830 inches; those two make 1,996, which added to the 2,830 would represent the whole flow; then deduct 2,573 and that leaves 2,253.

Q. For the increase?

A. And then that 750 wants to be added lower down, at the lower place.

Q. The 750 wants to be taken out below, to make the increase?

The COURT: The 750 is already in the calculation, gentlemen, the way you have it made; and don't have to be mentioned any more.

Mr. VARIEL: It is already in at both ends.

The COURT: It is accounted for. That makes the increase
760 between the head of the main supply ditch and the lower cross-section of 2,253 inches.

Mr. CHAPMAN (after discussion): I don't know what his object was, but I know that he gave the amount on the east end 1,823 inches.

Witness resumes: The matter of adding in the 750 inches to get the increase, isn't perfectly clear to me now. I will revise—look over the thing later, and try it again. I stated yesterday what I thought the discharge was from the Verdugo cañon watershed. That would all appear in the river at the cross-section, according to my theory that all this water goes into the river. Some of this increase is due to the Verdugo watershed. I estimated 750 inches I think I stated yesterday. The city water company diverts this surface water that I speak of, about 7 or 8 miles above town—about 8 miles, on the Feliz ranch; I don't know the name of that particular tract; there's several owners in there. It is near the Crystal springs; the Crystal springs is a part of the diversion. That is part of the diversion of what I call the surface flow; I include anything that is taken out of the river bed; that's all river bed there, the whole country there. I divided the diversion made by the city water company into two different kinds. The one was surface flow of 546 inches, and another was 700 inches, being the subterranean flow. That which I included in the 546 inches of surface flow is taken from somewhere near there—the branch pipe runs out towards the river. That dam has been shifted so much there that just at this present time I couldn't say. But it's above part of the pipe, because it runs over it. They use the water out of—their waste, from this ditch, to run into the pipes that they have under ground. The 546 inches that I speak of does not flow down into those pipes and go into the gate-house; it runs down in a flume; they use it
for water power at their old reservoir; it is located in the Elysian
761 park, just opposite East Los Angeles; about 2,000 feet towards town from the Southern Pacific Railroad bridge, and it is be-

low our cross-section—where it is used for power. They do not use that all the time. The measurements were made on the 19th of this month, day before yesterday, by Mr. Compton. I was not there. Measured the water that was flowing in this diversion ditch that the city water company use that they take from the surface flow—that's 546 inches—near the head. There is once in a while a connection between that surface flow and the underground pipes; I don't know where they run that. They use about a hundred inches out of that surface now for domestic use. I don't know whether they dump it in there; they dump it in—above or below. The underflow there is from my own measurement that I made some time ago. They use some portion of that 546 inches of surface flow, at least at times, for the purpose of supplying the city; the underflow is not sufficient. But where they let it into the pipes does not make any difference; it makes a diversion from the reservoir.

By the COURT:

Q. Well, it makes a difference whether it flows into the pipe. Did you measure below where there was any possible means of their getting any of this 546 inches into it?

A. Well, this pipe measurement, though, was made some time ago.

Witness resumes: There is no opening in the pipe up above where they can run surface water into it; they run it over a gallery.

Q. We are not speaking about any surface water that they have run from the under ground so that it will filter into this pipe in greater quantities, but we are talking ab-ut the direct flow into the pipe that may have increased your measurement in the pipe.

A. Well, that wasn't the case when I measured the pipe.

762 Witness resumes: I measured the pipe at a different time. There is no diversion from the pipe above the point that I measured the pipe. Of course if they ran surface water into the pipe, it would increase the flow of it. But when I made my measurement there was no surface water flowing into the pipe above the point that I made the measurement; and there was 700 inches. If there is any accession above in the pipe, it would only increase the quantity in the pipe whatever it is measured. I did not measure the point in the river above where these pipes are laid, above or below it, or within a short distance; I didn't make any measurement there. I made a measurement a great many years ago. The city water company was several years putting in all those underground pipes. I think they started in about '84 or '85—probably '85. I should say, they started in. They ran a cut into the Crystal springs. I started it myself long before that—made a partial cut in there. Then they followed it up and made the cut deeper. Then after that they must have been a couple of years completing that work. They found that they didn't get all the water they expected from the Crystal Springs drain, and then they ran a branch over towards the river and they paralleled the river and ran under it a long distance and there's where the main supply of the water company——. And they dug that out and probably a year after-

wards they started in on the other. I was up there from time to time and saw the work progressing. I presume they didn't get it all done, but—the way they were working on it. They would put in a little piece and then they would apparently stop work. They were a very long while at it. I don't know that it wasn't completed; and I don't suppose they consider it completed yet. They started to use the water that they got out of there probably in '84—from the time they commenced. I am talking about the Crystal springs. I don't know that the pipe was
763 completed and put in operation in the latter part of 1889 and beginning of 1890; I wouldn't say just what date it was completed. I am not evading you, Judge. I am telling you just the thing as near as I can—I have it. I can't tell you the year that they completed that work; as I told you in the first place that they were a good while in doing it. I think the work was commenced some time about '84 or '85, towards the Crystal springs. Subsequently it was extended towards the river. I couldn't state the date that that work was completed. At the time that that work was extended up in the direction of the river, the river bed was not at the same place that it is now. I was there when they were running that cut, and the river then was running inside of 200 feet from that cut; and it was somewheres near where their levee is now; I should say the river then run down somewhere near where their waste-gate flows. The river at that time wasn't running to the east of the present bed of the Los Angeles river along that section of the country where that pipe was laid. They ran across where the old bed was—their pipes east of where the old bed was. In fact, the bed came down and ran all over their pipes there and I think washed some of them out; I don't know what flood—what year it was: I remember of them having a washout there. The pipes were already laid when the washout came, and washed out a portion of their pipe. At that time, in 1889 and '90, I think, I was city engineer. I wasn't doing anything much on the river at the time for the city. We were making some surveys and I had some work to do for the city on the river most all the time. I did not measure the water in the river either above or below the place where the city water company's pipes were laid. I have made cross-section measurements below the point where they were laid, when I was
764 in the water works; they were merely to satisfy my own curiosity; they were for no other purpose. I don't remember what they were; I never kept any record of them.

Q. Don't you know that there is, and has been ever since those pipes were laid, more water running in the river a quarter of a mile below where those pipes touch the river margin, or intersect its bed—if that is the case at all—than there is either at or above this place?

Mr. CHAPMAN: Mr. Eaton, in his estimates which he has made for us this morning, treats the 700 inches of water that is brought away by the city water company's pipes from excavations underneath, as a part of the water of the Los Angeles river, of which he is exceedingly positive. What I propose to show by him is that there

never has been a time since those pipes were laid, any more than before it, that the river has diminished in the quantity of the water which has been flowing in it before that place, and is not now.

A. No.

Witness resumes: I did not say yesterday that when I made the measurements here at this cross-section within the last few days that there was no water running below the Macy Street bridge in the river. What I said about the water running below the Macy Street bridge was, when the city is diverting all the water from the Macy Street diversion then there was no water running down there. They didn't use to divert all the water, and there was water running down there, but lately they have put in another pipe. They have doubled the capacity of that ditch. Now they have the capacity there to divert all the water. But a year or two ago they were not. There was quite a stream running down there. They are not using the water there now; of course it's running. There might have been a time during the last seven years that the water wasn't flowing past the First Street bridge in this city; I don't cross the river every day. I suppose the quantity during
765 the summer will vary there considerable. I can't say that I have observed the water down at Seventh street, because I never cross there. In our measurements within the last few days we didn't measure the water at the First Street bridge nor at the Macy Street bridge. We made no measurement except at this one place, and the measure that has been made on the Hooker and Pomeroy land, and then these diversions that I spoke of. I have been in the employ of the city I suppose a couple of months on this particular trial. During that time I have made measurements of the amount of water in the river intermediate between the eastern boundary of the Pomeroy and Hooker tract and this cross-section, about three miles, I suppose, above the city boundary, and pretty nearly opposite Tropico in a western direction. In my estimate of the rainfall yesterday, I calculated the mountain area at 179 square miles and the average rainfall at 27 inches. That quantity of water over that range would furnish in miners' inches constant flow for a year, 17,655. I have got the others, for the 27 inches deep, figured out exactly. I had 127 square miles of foot-hills at an average of 18 inches. The total flow off of the 18 inches would be 8,350 miners' inches. And the valley at 182 square miles, is 10,000 inches. I haven't totaled it up. The run-off of the mountain watershed just amounts to one-half 13½ inches. That would leave 13½ inches for evaporation and plant life. Loss on the shed. That watershed would deliver 8,827 miners' inches. On the foot-hills I allow for evaporation and plant life 2,555 inches, leaving 5,795 inches loss on the shed, for evaporation and plant life. In the valley there is a half-inch, or $\frac{5}{100}$ of a foot run-off, 4 per cent., would make 400 inches as a net—400 from 10,000 would be 9,600 inches. That's plant life and evaporation; that would be 96 per cent. In the run-off I include the ordinary flow of the Los Angeles river
766 as well as the flood waters from the surface; that's what runs off of the river, you know. Then we take a percentage of

that, you know; then the percentage of the run-off would be—60 per cent. of that run-off occurs during storm water having only 40 per cent. of those figures that I gave you there as contributing to the normal flow. That gave 160 inches normal flow, and 240 would be what would be wasted in storm; that's for the valley. Now you want the foot-hill next; there's 2,555 inches run-off; there's 40 per cent. of that that makes up the normal flow; 60 per cent. is the storm; making 1,533 inches storm water and 1,022 inches normal flow. Now, of the mountains—there was 8,827 as a total run-off; 60 per cent. of that from storm water will be 5,296 inches, leaving 3,531 inches as contributing to the normal flow. These figures differ a little bit with my others, but it's a very small matter, it isn't over 70 or 80 or 90 inches. From the mountain there is 3,531 inches, the foot-hills, 1,022, and the valley 160. That's what I think goes to feed the Los Angeles river in its ordinary stages. That's 4,712 inches; it's a little bit more than I gave before; about 90 inches, I guess, more than I gave it the other way. Practically the same results. The storm run-off for the mountain is 5,296; foot-hills, 2,555, and valley 240; 8,091 inches is the aggregate of the storm run-off from all three sources. I have made an estimate of the storm run-off and the ordinary flow and the support of plant life and evaporation, from the Verdugo watershed; I took about 25 miles of mountain, with a 30-inch rainfall, and 50 miles of valley, undulating—I call it valley—at 20-inch rainfall. Now, that includes clear down to this cross-section, at the bridge; that don't include the Arroyo Seco. About 75 miles in it. The run-off for the mountain was 17 inches. There's—giving 12 cubic feet to the mountain. The run-off of the valley would be 2
767 inches, making 3 cubic feet, or 150 inches in the valley portion's share. That makes a total of 750 inches. That's what I consider that shed would yield to the normal flow of the river. I didn't figure out the Arroyo Seco; it comes in below this cross-section. I don't know that I have made a considerable study of this general subject; I have given the matter some thought. I have made some few observations myself in the matter of observing the percentage of run-off, surface run-off and of plant life and evaporation that satisfied me about what rules were applicable. I have one right there on that map, from Mormon canyon, in this watershed. I went to bed rock there and obtained all the water that was flowing out of that shed there. I got an inch and a half from the underflow, out of fifteen miles of watershed—miners' inch and a half. (Witness goes to map.) Mormon canyon is a part of the northwest, or western portion of this watershed, indicated by this dotted red line in here, and estimated at fifteen and a half square miles. I put a submerged dam in there at the mouth of that canyon and dug down to bed rock. When I got down there there was an inch and a half of water flowing at the bottom of the creek; the surface of the creek flows from 15 to 20 inches during the summer flow. It was in the summer that I measured it. The elevation there is about 1,000 feet above sea level, and probably 800 feet where it joins with the main stream leading into the river. The elevation

where it comes out of the mouth of the canyon is about a thousand feet. There is a map here that—the contour map (examining same). The contour doesn't run over there. I think 1,000 feet is about the elevation at the mouth of the canyon. At the crest the elevation is 3,792 feet. Up at the upper end of the canyon it is 1,118 feet. The distance I should say is about five miles
768 from the outer edge of the shed; five or six miles. Six miles I guess. I did not formulate my rule for the percentage to be allowed for run-off, underflow, plant life and vegetation, from the results of the experiment there: I have information from other sources upon that subject. In my experience and observation over any considerable tract of country such as we are dealing with here, there are differences in the amount of rainfall, due to local conditions or situation. The rainfall of this valley is influenced by local conditions. Right here in Los Angeles valley. At points separated by ten or a dozen miles, the rainfall would be much greater in one place than the other, and vary. The southern country is exceptional in that respect, but the same thing is observable most everywhere else where it has been observed at all. That is the case. I hadn't collected any data on rainfall east of here, but I think you will find it will increase in some parts—some places east, and also diminish. The same thing is true to the south. Less at Santa Monica than it is in Los Angeles. I heard Mr. Lippincott's testimony; I remember what he stated his rule to be; he didn't take the seacoast for his basis; he took Los Angeles. He didn't tell me that his principle was constructed upon the seacoast as a basis, but that he had the record in Los Angeles he disregarded the seacoast because there was such a trifling difference that it didn't make any material difference in his calculations; I don't remember of his telling me anything about that. I applied his rule to the nearest rainfall, the rainfalls in the different—didn't go away off somewheres else to get a rainfall to apply it to. I supposed the rainfalls in the valley was the proper place to apply it to. When I was applying it to the mountain sheds I took the Newhall gauge and the San Fernando gauge and the Van Nuys home gauge, and I took the mean of it; it comes to about 17 inches. I took an elevation of 1,000 feet. — took his average of mountains, which he said was
769 1,700 feet above sea level, making 1,700 feet above the valley of San Fernando, which would give 27 inches. Now, I didn't take into consideration the reduction of that rainfall that might be caused by the desert winds there. The rainfall at Ravenna is very much less than the rainfall at San Fernando, and the elevation is more than double. I just took this San Fernando valley, took the mean average rainfall there, and an altitude of 1,000 feet, and computed the altitude from that elevation and then applied Mr. Lippincott's rule; I included the Newhall, which increases the San Fernando's average about two inches. I don't know who kept the gauge at the Van Nuys homestead; the information that was obtained by the city engineer was obtained by Mr. Van Nuys. Mr. Van Nuys lives in Los Angeles now. I guess he has for the last 10 or 15 years; I don't know how frequently he goes to the ranch. I

don't know that he didn't keep that rain gauge; he might have kept it when he was at the ranch and some one else kept it when he wasn't. To be certain about the thing I took the three gauges and took a mean of them. I don't know who kept the gauge at the San Fernando station. Did not know the kind of gauge that was used. This information was obtained from the railroad company; I think at all three of the stations—Ravenna, Newhall and San Fernando—I am not positive about that; this data that I have is the best the city engineer could obtain. I think he got his information in regard to Newhall and Ravenna from the railroad company; I am not sure. I don't know who kept it, nor what kind of a gauge was used, nor how it was situated. I don't know except what I have been told. I was told the gauges were different, but I don't know anything about it myself. I said I had some knowledge of borings at this cross-section that I have made here recently. I

770 didn't make any borings there years ago; I simply was observing the borings that were being made there. I was with the water company at the time, and I was there a great deal, and passing by there and saw the work going on. I think that was something like '77 that work was done. These borings were made under Captain Kelleher, or Moore and Kelleher. I think they were at work for the city. They were talking about putting in a submerged dam there at that time. I commenced the recent borings for the purpose of inves-igating about a week ago. I think there's four wells there that have gone down to bed rock. They were bored under the direction of the city engineer; he had engineers there in charge of the work. I don't know the name of the well-borer; there was three borers there. I was there last Sunday and saw three outfits there, and two of them was at work and one of them was not. One of those wells was about 200 feet, or less perhaps, from the western bank—western bed rock. In my investigations upon the Pomeroy and Hooker tract, or in the vicinity, and more especially on this tract, I have not personally taken any means to ascertain as nearly as I could what the velocity of the underflow is; but there has been some investigations made for the purpose of this suit. I was not present; I could give you what information I have of it. When I stated that there are places where the water in this section of land don't move a foot a year, I mean where the texture is very close, very fine sand there, and clay mixed with it; I don't think the water has ever had any movement to it. I don't think that the test of the velocity at one point would furnish any very definite basis upon which to determine the velocity all over the whole tract. We didn't make any tests with that view.

Redirect examination.

By Mr. DUNN:

771 I think the rainfall at Santa Monica is 13 or 14 inches. The difference in the rainfall between Santa Monica and Los Angeles is very much greater even than the difference between Los Angeles and San Fernando, I think. I couldn't state from that

elevation that's placed on there what the elevation at the mouth of Mormon canyon is, because I don't know just whether it belongs to that particular point or not. Assuming that the elevation at the upper end of the canyon was 1,118 feet and at the lower end of the canyon 1,000 feet, the fall would be something like 20 or 25 feet per mile, but I know it has more fall than that. The elevation of the valley half way between the mouth of Mormon canyon and the Van Nuys ranch would be 800 feet; 200 feet difference in 6 or 7 miles, probably; the general fall of the water is a little steeper at the mountains; it has a pretty good fall away from the mountains and then it flattens out afterwards. At the mouth of Mormon canyon I got right down to bed rock, and took all the underflow there was from that canyon. It amounted to an inch and a half. The summer surface flow there is about 20 inches. There was about 15 inches when I was working there. I drove a tunnel under the San Gabriel river about a mile from the regular diversion point of all the waters that are taken out of there. I drove the tunnel in sand and boulders; it is coarser material than this, a great deal. We had a hundred inches of flow from that, and there was 33—it was 33 feet deep. The cross-section area was 10,000 square feet; that would be an underflow of a miners' inch to the square foot on this one—that's the only tunnel I have observed. I don't think the work of laying the underground pipes of the Crystal Springs Water Company is completed yet, because they are short of water now. During the summer months they have to draw about a hundred inches from the surface flow. I stated that the water flowing under this land did not, in my opinion, have
772 a uniform flow, throughout the whole cross-section; it flows in some places very much faster than it does in others. It is because there is little resistance, due to the voids being larger, coarser material. The voids are larger in uniform material, and there is less resistance in coarse material of the same voids as fine material, because there is less surface in contact. The molecular attraction is less. The same principle as discharging water through a 12-inch pipe or through as many one-inch pipes as will discharge the same quantity. You will have very much more periphery in the number of one inch pipes than you will have in the one 12-inch pipe. Therefore, the resistance proportion to the area through which the water flows is very much greater in the voids through fine material than through coarse.

By the COURT:

Q. You mean that the same amount of water in the same space of time will not flow through a number of one-inch pipes of the same area as a 12-inch pipe carrying the same space?

A. The friction is very much greater, because the periphery around the number of those one-inch pipes——

Q. I wasn't asking what the reason was; but the result would be there would be less water flow through the one-inch pipes, is that what you mean to say?

A. No; you just supply enough one-inch to deliver the flow from the 12-inch——

Q. Suppose the capacity of the two—I don't mean the practical capacity, but the actual space inclosed in the pipes was the same?

A. The actual space was the same—the area being the same, under the same head, the flow through the one-inch pipes would be very much less than through the 12-inch.

Witness resumes: I think I figured that there was something like 4,826 inches of water flowing in the river and taken out of the river at various points down to this cross-section. I think that is
773 what we added it up. I have also figured that the total yield from the underground flow of this watershed is between 47 and 48 hundred inches. 750 inches comes from Verdugo, and the difference between what I have taken out upon the surface and what is flowing upon the surface, theoretically, ought to represent what is flowing underneath. But then these results we can obtain from rainsheds are only approximate. It is my opinion that so much water as represents the yield of this watershed for a normal flow practically all rises to the surface before it reaches this cross-section; I believe four-fifths of it does. And that the balance represents the underground flow at this point. Assuming that the 19,000 inches of water, testified to by Mr. Finkle and Mr. Newman, as flowing underground at this neck, has a velocity at the rate of ten feet an hour, it certainly couldn't get through this lower cross-section at all without coming to the surface in immense volume, because the cross-section up there is very much greater than this. It has been testified by the other side it is about 1,300,000 feet, and I have reason to believe it is possibly that large. The valley is very wide there. And that is over six times as great as the cross-section we find below. Supposing the underground water was only two feet per hour, and there was 19,000 inches of it, it would not go through this lower cross-section without coming to the surface and making an immense addition to the surface flow. About three feet an hour would give, I guess about 3,000 inches. There is 19,500 all together up there; and then there is 2,500 running on the surface; leaves 17,000 about, running under ground. If there was that quantity running under ground there and there was 3,000 running here, if it was running at that velocity, why, there would be 14,000 inches running on the surface down there, plus what is coming in from the Verdugo.
774 To carry out that theory there would have to be 14 or 15 thousand inches flowing in the river on top of the ground at this section; the material being the same in the cross-section here as it is up there; that is, having the same capacity.

This measurement that we made at the point of this lower cross-section day before yesterday shows a material increase at that point in the surface of the river; a material increase from the Pomeroy and Hooker land down. The increase is all the way down; the large part of that increase takes place before it reaches the water company's diversion, four or five miles above this. There is fully 600 inches increase above where they take the water out. If there is 19,000 inches on this land flowing under ground, and this cross-

section down below is of the size I say it is, the water would have to flow under ground about 18 or 20 feet an hour, to deliver this quantity of water, if we accept 1,300,000 square feet up there. I think that would be about it—assuming that the percentage of voids is the same one place as the other. I asked my attorney if they would please have these figures checked, if I made them on the stand here. Any objection to having them checked?

Mr. CHAPMAN: Certainly not; I want them correct.

The COURT: If you find any errors in your figures, you can correct it.

Cross-examination.

By Mr. CHAPMAN:

I said there might possibly be a little increase in the river due to cultivation. But there was some time ago a material increase in the river below Macy street; but that was due, as I told you, to a culvert, the Zanja Madre, which I made smaller, throwing some of the water out into the river. The Macy Street diversion hadn't the
775 capacity to carry it. But recently they have doubled it. That don't increase the quantity that came down here to the north boundary of the city. I simply used less water in the Zanja Madre and more went off down the channel through the city. Well, there possibly has been a little increase. I believe there should be a little increase. I don't think it is very material though. But I think it is due to cultivation up there. As they intercepted—these vehicles that stop this storm water, and hold it back, why, it naturally should increase. Twenty years ago the Los Angeles Water Company's subterranean pipes, tapping this subterranean flow up here, were not laid. Twenty years ago there was about the same amount of water I believe being diverted by the city in the same vicinity of this main supply ditch. The Zanja Madre used to be a large ditch then. They took more water out there than any other place,—the Zanja Madre. Twenty years ago there was not as much water being diverted by that ditch on the Pomeroy and Hooker tract or in the immediate vicinity, as there is now, because it wasn't enlarged. They enlarged it in '77 or '9 I think; somewheres along there. I mean the main supply ditch. I remember a company that was organized her- for the supplying of the eastern portion of this city, that was known as the East Side Spring Water Company. I know where the excavation is that was made by them, for the purpose of pumping water. I have seen the hole they dug there. That is below this cross-section of which I speak, I should judge about a mile, and I should say about 1,500 feet from the artificial channel of the river, to the eastward. I think that excavation was a hole about 20 or 30 feet square, when I was there. I didn't pay much attention to it. I don't know how deep; I didn't measure the depth of it; it had water in it, and I couldn't see the bottom. The water wasn't clear when I was there; there was scum on it.
776 The pump wasn't running; I have seen the pump running. I don't know how much they pumped out of that reservoir in

a day when they were running it. I have seen the pump running, from the road, which is about a thousand feet away from this pump; I couldn't tell. I wasn't at the spring. I don't know how much they did pump a day. I was never there at all when they were pumping. I don't know whether the pumping made any impression upon the water, as to the amount of it or not.

Re-direct examination.

By Mr. SCOTT:

I didn't mean to say I have never seen the river dry at the First Street bridge, because I haven't paid much attention to it the last seven or eight years. It might have been dry for all I know.

BURR BASSELL, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I have been in the employ of the city of Los Angeles recently boring these wells, that are indicated on these three profiles, Plaintiff's Exhibits 15, 16 and 17. I was personally in charge during this well-boring, and kept a record of the wells. This record showed the material which we encountered at different points in the wells, and the points at which we encountered that material in depth. The records, showed the strata and formation, and the depth of the strata, in each well, of each particular strata. I have examined these Exhibits 15, 16 and 17. Those exhibits were made from my field-notes of the examination in the field. I have compared the exhibits with my field-notes. I have examined each one of the profiles contained on these three
777 exhibits. In boring the well marked "City well A. 1" of Defendants' Exhibit 17 we found sandy loam for five feet, from five to ten feet fine sand; from 15 to 18, a moist clayey sand, meeting the water plane at 17 feet, measured distance. From 18 to 21, was saturated fine sand. From 21 to 26 was small gravel, with medium coarse sand. From 26 to 27, was coarse granitic sand and gravel, with abundant water in that formation. From 27 to 32 was coarse granitic sand and gravel. At 32 feet I met three inches of clay. From 32 feet to 34, very coarse sand and gravel. At 38 feet one inch of clay. From 34 feet to 40, the end of the well, very coarse sand and gravel. I have examined the notes and the picture of that well as shown upon this profile. Those notes set forth the conditions at the various points correctly upon this profile. In the well marked "City well A. 2" from the surface to four feet a sandy loam, soil. From 4 to 15 feet, very fine river sand. Meeting the water plane at 15 feet, by measurement; 15 to 20 feet coarse sand. At 20 feet two inches of clay. From 20 feet and 2 inches 26 feet, very coarse sand and gravel. From 26 feet to 35, still coarser granitic sand and gravel. Stopping the well at 35 feet. In these different wells below the plane of saturation the material was all saturated, excepting the stratas of clay that we met with, which

contained little or no water. It can be determined in boring, when you strike strata in which the water flows more freely than in other strata, in some wells. When you strike a very coarse formation, very coarse sand and gravel, and, in some of the wells we met with, fine and coarse gravel with very little sand, when we would pump it out the water would be comparatively clear, showing there was very little sediment or fine material in that formation but abundance of water. Well No. 3 of the "A" line. We have 4 feet of sandy loam. From 4 to 10 feet, fine sand. From 10 to 18 feet, a clayey sand; sand with quite a little sediment
778 in it. And at 18 feet we met the water plane, by measurement. From 18 to 23 feet, coarse sand and gravel. At 23 feet we met one foot of clay. From 24 feet to 29, very coarse granitic sand. And from 29 to 34 we had quicksand. From 34 to 35 feet, it was very coarse sand and gravel. And ended the well at 35 feet from the surface.

Well No. 4 of the "A" line. From the surface, 5 feet was a sandy loam soil. At 5 feet we met a nest of boulders, a stratum of boulders about a foot in thickness. And from 6 to 7 feet it was a layer of sand, fine river sand. Then at 7 feet we had another foot, about, of coarse boulders. From 8 to 9 was fine sand. From 9 to 13, medium coarse sand. From 13 to 17 feet, very coarse granitic sand. Meeting the water plane at 17.4 feet. From feet, the formation changed to still coarser sand 17 to 22 feet we had coarse granitic sand. At 22.5 and gravel. And, as far as to 29 feet, was very coarse material, coarse sand and gravel. At 29 to 33 feet, coarse granitic sand and still coarser gravel. We ended the well at 33 feet.

Well No. 5 of the "A" line. From zero to 6 was the soil, or sandy loam. From 6 to 13 was a clayey sand. From 13 to 18 feet was coarse yellow river sand. We met the water plane by measurement, at 16 feet. From 18 to 22 feet, coarse granitic sand and gravel. From 22 to 31, the end of the well, there was pea gravel and very coarse sand and boulders. By "pea" gravel, I mean gravel about the size of peas. I will give the number of the station as well as of the well, as I go along.

The next well was No. 6 of the "A" line, which is at the south side of Alameda street. Station zero on this profile running south to the river, and station zero running north, because we hadn't at that time, determined how far north we would bore our wells. All the other profiles begin at Alameda street and run towards the river, with this single exception. The zero point of this profile
779 being at Alameda street. The location of well No. 6. From zero to 12 feet, very fine sand and loam. From 12 to 17.5 feet, coarse yellow sand. At 17.3 feet, by measurement, we met the water plane. From 17.5 feet to 22 feet, very coarse granitic sand. From 22 to 27, coarse red sand. From 27 to 28 feet, still coarser sand and gravel; very little sand, mainly gravel. From 28 to 31, still coarser sand and gravel. Stopping the well at 31 feet.

Well No. 7 is at station 5, plus 100 feet, station 6, it would be, of the "A" line. From zero to 12 feet, was fine sand and loam. From 12 to 24 feet was coarse yellow sand. From 24 to 26 feet, very

coarse sand and gravel. I believe I have omitted to mention that we met the water plane at 18 feet. 16.6 feet, the water plane. From 26 to 28 feet, very coarse granitic sand and boulders. 28 to 32, still coarse sand and gravel. We met with 3 feet of fine clayey sediment at 29. From 29 to 32, making 3 feet of fine sediment. And from 32 feet to 34, very coarse gravel and boulders. Ending the well at 34.

Well No. 8 of the "A" line is at station 12. From zero to 6 feet is loam. From 6 to 9 feet, very coarse sand. And between 9 and 10 feet we have a fine clayey sediment. From 10 to 12.1 foot of black clay. And from 12 to 14 feet, we had yellow clay; then from 14 to 20 feet, we have the fine river sand again. Then from 20 to 30 feet we have clayey sediment, fine deposit with a great deal of sediment in it. And from 30 to 35 feet where we ended the well, was coarse sand and gravel.

Well number 9 of the "A" line is at station 18. From the surface to 12 feet was fine river sand. From 12 to 12.5 is a coarse yellow sand. 12.5 to 18 feet is coarse granitic sand. 18 to 20 feet is a fine sand, with some clay mixed in it. From 20 feet to 38 feet,
780 very coarse sand and gravel. Ending the well at 38 feet. The water plane was met at 15.4 feet.

Well number 10 of the "A" line was at station 23, plus 33 feet. This was in an old wash of the Tejunga, and is dry sand. Very coarse granitic sand for 9 feet, at which point we met the water plane. From 9 to 12 feet still coarser sand and gravel. From 12 to 13 feet 1 foot of boulders. From 13 to 15 feet is coarse river sand. From 15 to 16 feet is a yellow clay. From 16 to 18 feet is coarse sand and gravel. From 18 to 30, the end of the well, very coarse sand and gravel.

Well number 11, at the end of the "A" line, is on the north side of Verdugo avenue. Station 27, plus 30. And from zero to 4 feet was soil, sandy loam. From 4 to 16 feet was fine river sand, meeting the water plane at 13.5 feet. From 16 to 19 feet fine river sand. From 19 feet to 24 feet about the same material. A little bit coarser sand. From 24 to 25 feet, very coarse sand; coarse granitic sand. From 25 feet to 29 feet sand and gravel. From 29 to 31 feet, still coarser sand and gravel. From 31 to 34 coarse sand and gravel. Very little difference in that material. Then from 34 to 35 feet, 1 foot of very fine sand. From 35 to 39 feet quicksand. At 39 feet we met about 2 or 3 inches of yellow clay. Then from 39 feet 2 or 3 inches, to 43 feet, it was very coarse sand. At 43 feet we met with about 4 inches of clay again. And from 43 feet and 4 inches to 45 feet, and a little over, where we ended the well, it is coarse sand and gravel.

On the profile "B" we bored no wells. We have the shallow wells that were driven by the defendant.

"Block line C," beginning near the river, we have, at station 35 of the profile—I shall begin at the other end. At station zero of the profile, well number 1 of the "C" line. We have sandy loam for 14 feet. From 14 to 18 feet, the fine sand. Meeting the
781 water plane at 18 feet from the surface. From 18 to 19 feet, still finer sand, with some sediment; clayey sediment. From

21 to 26 feet, fine river sand. 26 to 27 very coarse granitic sand. From 27 to 30 feet, fine river sand; almost quicksand, it was so fine. And from 30 to 32 feet, coarse river sand. 32 to 33 feet, very coarse granitic sand and gravel. Ending the well at 33 feet. Well number 2 of the "C" line. At station 8 plus 10; 810 feet from well number 1. From the surface to 12 feet was loam, fine soil; fine sandy soil. I mean that fine sandy soil wherever I speak of loam; it is the same material as at the very surface. Sandy loam is the nature of most all the soil in the valley portion there. From 12 to 14 feet, fine river sand. And from 14 to 17 feet, a little coarser sand, very little coarser sand, very little change. Meeting the water plane at 17.4 feet. And from 17 feet to 32 feet, there is a coarser river sand. At 22 to 23 feet, 1 foot of clayey sand; clayey sediment. And from 23 to 26 feet, very coarse granitic sand. And from 31 to 38, coarse sand and gravel; very coarse. Ending the well at 38 feet.

Well number 3 "C" line, at station 13 plus 10. Only three feet of soil, of sandy loam. From 3 feet to 6 feet river sand and boulders. From 6 to 11 feet, river sand and gravel. 11 feet to 18 feet, dry river sand and scattering boulders. Water plane met with at 18 feet. From 18 feet to 24 feet coarse granitic sand. From 24 to 28, very coarse sand and gravel; the gravel being from a pea to a walnut and apple in size; from 28 to 30 a red coarse sand. From 30 to 36, the end of the well, coarse granitic sand and gravel.

Well number 4, "C" line, at station 17 plus 50. Soil sandy loam for 6 feet. From 6 to 10, fine sand with gravel. From 10 to 12, very coarse sand—granitic sand and gravel. From 14 to 19 feet, coarse granitic sand and gravel. We met the water plane
782 at 19.1 feet from the surface. Between 12 and 14 there was still coarser granitic sand and gravel. From 19 to 22 fine river sand. From 22 to 27 feet, coarse granitic sand. From 27 to 29 feet, still coarser sand, and some gravel. From 29 to 33 feet, very coarse red sand. From 33 to 39 feet, the end of the well, gray, granitic sand, with gravel pea and apple size.

Well number 5, "C" line, at station 22. About 12 inches of sandy loam. And, from 1 foot to 16 feet, there was a fine river sand interspersed with small gravel. 16 to 19 feet, very coarse sand and small gravel. From 19 to 21, still coarser sand and gravel. Meeting the water plane at 20 feet. And from 21 to 22 feet, it was very coarse sand and boulders. And we met with so many boulders at 22 feet that we ended the well at that point, in a nest of boulders.

Well number 6 of the "C" line, at station 26, plus 50. We had 6 feet of sandy loam, with some occasional gravel. And from 6 to 15 feet medium coarse sand. And we met the water plane at 14.4 feet. This well number 6 is in Alameda street. From 15 to 18 feet, coarse granitic sand, with a little gravel. From 18 to 23, still coarser granitic sand. From 23 to 24 feet, 1 foot of gravel, with very little sand; pea, apple and walnut size. This is one of the wells number 6 of the "C" line, which showed signs of abundant water in that material. And from 24 to 27 feet, the end of the well, was very coarse granitic sand and gravel.

Well number 7 of "C" line, which is station 30, plus 35. From the surface to 10 feet was a sandy loam. Was moist at 10 feet. From 10 to 12 was a clayey sediment. And we met the water plane at 10 feet and a half. From 12 to 16 feet was a coarse red sand. From 16 to 18 feet a still coarser red sand. From 18 feet to 20, coarse granitic sand and gravel. At 20 feet we met with a nest of
783 boulders, about a foot in thickness, probably. And from 20 or 21 feet to 28 feet, the end of the well, was very coarse sand and gravel; granitic sand.

Well number 8 of the "C" line was at station 35. The first 8 feet, from zero to 8 was a sandy loam. From 8 to 11.5 feet was fine sand; fine river sand. And at 11.5 feet we met the water plane. And from 11.5 to 12, we had blue clay, and from 12 to 16 feet coarse granitic sand. From 16 to 17 feet coarse sand and boulders. Ended this well at 17 feet, on account of the nest of boulders. Those were all the wells we bored on block line "C."

The profile shows th- driven wells by the defendant, with the exception of one deep well, at the end of this line which intersects the tunnel line; and which well is known as well number 1 of the tunnel line; which was 66 feet deep. We did not bore these; the others we bored, including the deep well, 66 feet deep, on the tunnel line at the end of this block line "C." I know something about the location of those wells which were bored by the defendants. I only know in a general way as to whether that map correctly represents their location and depth and formation. I wasn't present when the levels were taken in those wells. I have seen them by passing over the ground. So far as the depth to the water plane in those wells are concerned, I cannot say, from my own knowledge. I believe them to be correct.

The well at the end of line "C," at the intersection with the proposed tunnel line, known as well number 1 of the tunnel line—the first 11 feet was pure fine sand. And at 10 feet in depth we met the water plane. From 11 to 16 feet, coarse granitic sand. From 16 to 32 feet very coarse sand and gravel, with some boulders. From 32 to 35, coarse gravel; scarcely no sand. And 35 to 36 feet was 1 foot of yellow clay. From 36 to 48, gravel and boulders. The gravel was pea, walnut and apple size. From 48 to 59 feet, very coarse sand and gravel; granitic sand. From 59 feet to 60, fine
784 sand. Then from 60 to 60.5 feet, was 6 inches of yellow clay. And from 60.5 to 61 feet, fine sand. From 61 to 61.5, 6 inches more of yellow clay. And from 61.5 to 66 feet, where we ended the well, very coarse sand and gravel; granitic sand.

The next is block line "D," on Exhibit 17. Well number 1, "D" line situated at station zero on Alameda street—Verdugo street. From zero to 4 feet, sandy loam; soil. From 4 to 20, coarse sand and gravel. Meeting the water plane at 16.4 feet. From 20 to 28 feet, coarse granitic sand and gravel. From 28 to 32 still coarser sand and gravel. From 32 to 38 feet was a yellow clayey sediment; clayey sand; saturated. From 38 to 41 feet, where we ended the well, medium coarse sand and gravel. Well number 2 or the "D" line, at station 5. I would say that all the wells of block line "D"

are accurately 500 feet apart. From zero to 4, soil; sandy loam. 4 to 20, fine river sand. From 20 to 23, there is a medium coarse sand and gravel. We met the water plane at 15.8 feet. 23 to 30 feet was a yellow, sedimentary clay; clay formation. From 30 to 34 feet, very coarse granitic sand and gravel. From 34 to 40, very little sand and mostly fine gravel. Ended the well at 40 feet.

Well number 3 of the "D" line, at station 10. From zero to 4 feet of soil was sandy loam. 4 to 14, very fine sand. We met the water plane at 14 feet. At 14 to 20 feet, river sand. 20 to 30 feet, coarse granitic sand and some gravel. From 30 to 36 feet, very coarse granitic sand and gravel. And from 36 to 39, where we ended the well, still coarser sand with gravel.

Well number 4, "D" line, at station 15, was in Olive avenue, a diagonal avenue running across this tract as shown on the map. From zero to 4 is sandy loam, or mostly sand. From 4 to 20, very fine river sand. We met the water plane at 7 feet in that well. And from 20 to 28 feet, very coarse sand and gravel. At 28
785 to 33 feet coarse granitic sand, with a great deal of gravel. This was fine water-bearing material. And we ended the well at 33 feet.

Well number 5, "D" line, is at station 20, in an alfalfa field, also in Buena Vista street. It was in an alfalfa patch which was nearby Buena Vista street running north and south. From zero to 2 feet was a sandy loam; soil. From 2 to 4 feet, yellow sand. From 4 to 12 feet, gray sand and gravel. We met the water plane at 5.5 feet, at this point. 12 to 14 feet, still coarser g-anitic sand and gravel. At 14 to 18 feet, coarse sand with some boulders. And from 18 to 30 feet there was very little fine sand; mostly gravel and boulders. This also was a fine water-bearing material, and ended the well at 30 feet.

Well number 6 of "D" line at station 25. From zero to 2 feet, a sandy loam, soil; from 2 to 5 feet of yellow sand, medium coarse. At 5.8 feet we met the water plane. And from 5 to 20 feet was a coarse granitic sand and gravel. From 20 to 22 feet, still coarse sand and gravel. From 22 to 24 feet, very coarse granitic sand and gravel. Ended the well at 24 feet.

Well number 7 of the "D" line, at station 30. Sandy loam for 11 feet. From 11 to 13 feet was the yellow sand, medium coarse. 13.5 feet we met the water plane. And between 13 and 20 feet, coarse, gray, granitic sand. 20 to 22 feet, the same coarse granitic sand and gravel. Still coarser between 26 and 30 feet. And at 30 feet to 32 where we ended the well, was very coarse gravel and very little sand. What I have designated as pea, walnut and apple sized gravel. Fine water-bearing material.

Number 8 of the "D" line is at station 35. 10 feet of soil or sandy loam. From 10 to 18 was fine sand, and no gravel. We met the water plane to 15.8 feet. From 18 to 25 feet, fine sand. 25 to 26 feet, was 1 foot of boulders. From 26 to 31 feet was fine
786 black sand, with no gravel. From 31 to 34 feet, coarse granitic sand. From 36 to 38 feet, sand, gravel and boulders. From 38 to 40 feet, coarse sand, no gravel. From 40 to 42 feet was gravel,

with very little sand, pea, walnut and apple size. From 42 to 44 feet, the end of the well, gravel and boulders.

Well number 9 of the "D" line, at station 40. From zero to 6 feet, fine sand. From 6 to 17 feet, fine granitic sand; river sand, as I term it. At 11 feet we met the water plane. From 17 to 23 feet, coarse sand and gravel. 22 to 30 feet, very coarse granitic sand and gravel. Ended the well at 30 feet.

Well number 10 "D" line, near station 45. From zero to 16 feet was pure white sand. We met the water plane at this point 4.2 feet beneath the surface. That is off the mesa. From 16 feet to 17, 1 foot of blue clay. From 17 to 20, very coarse granitic sand and boulders; abundance of water. This was exceedingly coarse material. From 20 to 24 feet, still coarse granitic sand, with some boulders. And from 34 to 40, the end of the well, was very coarse sand and gravel. No boulders in that.

Now, near the end of "block line D," on the south side of the river, where it intersects the tunnel line—not exactly at the intersection, but very near—was well number 2 of the tunnel line, the record of which is as follows: This would be about station 72 plus 61, of the tunnel line. South side of the river, near the base of a little conical hill on a mesa, right at the point where the last filtration gallery branches off; it would be the end of the proposed tunnel. Beyond that I call it filtration gallery. At that point we bored two wells, striking the nose of the hill in the first well, which I will now describe. Zero to 20 feet, fine sand. Probably about two feet of soil; a little more loam in the first two feet. But it was a white gray sand, whitish in color. From 20 to 25 feet was a medium coarse sand and gravel. We met the water plane at about 25 feet. I say "about," because I wasn't there at
787 that time, and I had to take the well-borer's measurement for it, which was no doubt about correct. From 25 to 28 feet a stata of blue clayey sand. 28 to 31 feet was a yellow clay, with some gravel. From 31 to 34 feet, coarse granitic sand and gravel. And we ended the well at 34 feet, striking what seemed to be a sandstone formation of the hill. Then we bored a second well a little farther to the north, and a little nearer the river. This profile shows the well I have just described; the other one isn't shown on that profile "block line D." I think it is shown on the "tunnel line" profile, as well as the well—the 66-foot well, that I have already described. The second well near this point was 44 feet. I think I may as well describe that now; I would like to see the "tunnel profile" for that, now, though. It is about 30 from this last well I have just described,—northeast from the one I last described. The record of it is as follows: From zero to 26 feet there is a fine, dry sand, with about 2 feet of soil, sandy loam. From 26 to 27 feet, fine sand, with some gravel. We met the water plane at 27 feet. From 27 to 28 feet, gravel, with some sand. From 28 feet to 29 feet, one foot of yellow clay. From 29 to 32 feet, very coarse sand and gravel. From 32 to 35 feet, coarse sand and boulders, some gravel. From 37 to 39 feet, blue clay. From 39 to 42 feet, clayey gravel,

very little sand. From 42 to 42.5, 6 inches yellow clay. From 42.5 to 44, the end of the well, very coarse granitic sand and gravel.

Block line E is the westerly line of that map (Plaintiff's Exhibit 14). Well number 1, near station zero, sandy loam for eight feet; 8 feet of soil. From 8 to 18 feet, fine river sand, with no gravel. Met the water plane at 15.3 feet. From 18 feet to 20, coarse sand and gravel. From 20 to 25 feet, very coarse granitic sand and gravel.

From 25 to 26 feet, 1 foot of yellow clay; sedimentary deposit.

788 From 26 feet to 38, very coarse granitic sand and gravel. This was pea, apple and walnut sized. Fine water-bearing material. This well was nearest to the Pirtle excavation of the wells we bored. It is in Verdugo avenue. The Pirtle excavation extends down as far as Verdugo avenue; it crosses it a short distance; this is just east of it, probably two or three hundred feet, where the Pirtle excavation crosses Verdugo avenue, this is about 300 feet of it. The Pirtle excavation does not extend down across this block line; the end of the flume is very nearly at this line, down south of this well. The profile of "block line E" shows the surface flow from the Pirtle development; that is the ditch. And we are not permitted to bore a well in there, and we had to go down to the next 40-foot street, which is station 13 plus 30. And this is marked well number 3. I anticipated boring a well between there, but failed to get the privilege of doing so. Consequently this is marked well number 3 of the E line. From the surface to 4 feet is a sandy loam. From 4 to 18 feet is a fine river sand. We met the water plane at 12 feet. From 18 to 30, coarse granitic sand and gravel. From 30 to 38 feet, the end of the well, still coarser sand and gravel.

Well number 4 of the "E" line is station 18 plus 50. From zero to 10 feet was the sandy loam. From 10 to 12 feet, fine river sand; 12 to 14 feet, the same character of material, a little moist. We met the water plane at 14 feet beneath the surface. From 14 to 17 feet, coarse granitic sand, without gravel or boulders. From 17 to 26 feet, was coarse granitic sand and gravel. And from 26 to 27 feet, one foot of yellow clay. From 27 to 28 feet, coarse sand and gravel. And from 28 to 32 feet, the end of the well, very coarse sand and very little gravel.

Well number 5 of the "E" line, at station 23. From zero to 10 feet, sandy loam and soil. From 10 to 16 feet, fine river sand,

789 no gravel. Met the water plane at 13.8 feet. From 16 to 18 feet was fine river sand, with a few gravel. From 18 to 26 feet was fine sand, excepting at 20 feet. From 20 to 22 feet, we had yellow clay. From 22 to 26 feet, fine sand. Then from 26 to 38 feet, coarse granitic sand and gravel; pea and walnut sized gravel. At 38 feet we ended the well.

These were all the wells we bored on "block line E." "Profile line E" shows the water plane and the driven wells made by the defendants.

Now, I want to state that there is a slight error in the surface of this profile of "block line E." It does not affect the depth of these borings, which I have verified; but the surface of the ground at the

lower end of this profile "E," the draughtsmen have made a slight error. I think the mistake comes from an error in numbering the heavy lines of this profile; putting, for instance, a 500-feet elevation where 490 should be. The surface of the ground should be about 8 feet lower. It is for the whole profile. Block line E is only from the middle of this. It does affect it through here; the lower portion of it, to the south of -he last well the city bored. I would have to examine that again as to the surface. I know that the distances upon the surface to the designation of the borings in these wells, is correct; but I can't say as to the surface of the ground from the mesa up, without looking at the field-notes of the deputy who ran the profile. It is just an error in assuming a wrong elevation, that is all. It doesn't affect the depths of the strata, and I think it does not affect the relative appearance of the different parts of the profile except vertically. Block line "F." Well No. 1 at station 15. One foot of sandy loam soil. And from 1 to 13 feet, fine dry sand. We met the water plane at 11 feet. From 13 to 15 feet, medium coarse river sand. From 15 to 17 feet, coarse river sand with no gravel.
790 From 17 to 18 feet, the end of the well, very coarse granitic sand, no boulders. Very few at the bottom.

Well number 2, at station 20. This well number 2 is inan old wash of the Tejunga, dry wash. From the surface to 10 feet was coarse granitic sand. We met the water plane at 8 feet from the surface. From 10 to 11 feet, still coarser granitic sand and gravel. This gravel was fine pea, walnut and apple size, and continued abundant water. And from 11 to 21 feet, the same coarse granitic sand and gravel. 21 to 24 feet, still coarser sand and gravel. And we ended the well at 24 feet.

Well number 3, at station 28, plus 57. Fine river sand from the surface to 15 feet in depth. We met the water plane at 10 feet. From 15 to 28 feet, clayey sand; a black clayey sand, containing very little water. From 28 to 30 feet, coarse granitic sand. This had coarse granitic sand and gravel. This had pea, walnut and apple sized gravel, and fine water-bearing material. We ended that well at 30 feet.

Well number 5 of "F" line, at station 33. I gave you the record of well number 4 then, which ended at 30 feet, instead of well number 3. I turned a page in my book. Now I will give well number 3 at station 25 of block line "F." From zero to 10 feet, coarse granitic sand, with occasional boulders, and from 7 to 10 feet, fine sand. We met the water plane at 7 feet beneath the surface. From 10 to 20 feet was fine river sand. From 20 to 21, was very coarse granitic sand and gravel; fine water-bearing material. From 21 to 25 feet, coarse sand and gravel. And ended the well at 25 feet. The draughtsman has ended the well on the profile at 22 feet, and showed a couple of marks down. I suppose he hasn't finished it. It should be 25 feet.

Well number 5 is at station 33. About 2 feet of sandy
791 soil. From 2 to 3 feet of fine dry sand. And from 3 to 10 feet, of medium coarse river sand. We met the water plane at 10 feet in this well. From 10 to 15 feet was river sand. From

15 to 16 feet was a yellow sedimentary clay, of 12 inches. 16 feet to 22 feet, very coarse sand and gravel. And then at 22 to 24, still coarser sand and gravel, mainly gravel. Ending the well at 24 feet. Then this profile "F" shows the dug wells made by the defendants, and also wells number 6, 7 and 8 of this same line "F."

Well number six of the "F" line is at station 51. From zero to 15 feet, medium coarse sand. We met the water at 6.5 feet. From 13 to 18 feet, very coarse granitic sand and gravel. And we ended the well at 18 feet, on account of boulders.

Well number 7 is at station 56, plus 50, on the mesa. From 1 to 2 sandy loam, soil. From 2 to 15 dry white sand, medium coarse. From 15 to 20 is a loose yellow sand. We met the water plane at 20 feet. From 20 to 26, coarse granitic sand. And from 26 to 30, the end of the well, very coarse granitic sand and gravel.

Well number 8 is at the intersection of block line "F" and our proposed tunnel line, on the mesa. About 2 feet of loam or soil. 2 to 10 feet of fine yellow sand. From 10 to 19 feet, a fine dry sand. From 19 to 22, a blue sand. We met the water plane at 20.7 feet. From 22 feet to 26 feet, blue sand, mixed with some gray and a little gravel. From 22 to 26—I gave that. 28 to 32 feet, still coarser sand and gravel. We ended the well at 32 feet.

Those were all the deep wells that we bored. The smaller wells that are indicated at various places between the deeper blue lines are the dug wells. I think I called them driven wells, in one instance, when I think I should have stated they were dug wells.

From the base of the mesa over here, I am quite sure that
792 the river elevation should be about 8 feet lower; should be an elevation of 490, instead of about 500, as shown here.

Mr. DUNN: I will ask, may it please the court, if it will satisfy counsel, that Mr. Bassell may examine this more carefully; and if that is so, I will have it corrected, myself. Will you look at that, Mr. Bassell, and if it is so, I will ask the permission of the court to correct it on the exhibit.

The COURT: Mr. Bassell can take the exhibit and correct it.

Cross-examination.

By Mr. CHAPMAN:

We did not find the bed rock in any of those wells that we bored, with the exception of the one well I speak of at the end of the tunnel line where we struck the nose of the hill, there, if you call that bed rock, I would say we met it. That is the single exception. We pulled up the casing and filled the wells, because we wanted to use the casing over again repeatedly. It don't cost as much to pull the casing as it would to furnish casings for each well. And then the property-owners objected to having a hole left in the ground where cattle could step in and break their legs. We filled up the wells when we pulled the casing out. The well-borers were instructed to do so. I wasn't there in every instance, but I think they did. We generally pulled up the casing and filled up the well immediately, as soon as they were through and they

were taking down their derricks to move to another point. All our levels are made from the water plane as it was shown by those borings, which we abandoned immediately upon finishing it. We ran the levels along the ground and determined the surface elevation. I measured the water plane myself from the surface of the ground. The measurement was not always made immediately. It would depend on circumstances. I would sometimes measure
793 the water plane in the morning after it had stood over night. Generally we would measure the first water when we would come to it. Sometimes leaving it to stand a little while, to be sure it got to its normal plane; if we used a sand pump we would pump the water out and wouldn't get the true elevation. And I was governed in the time when to take the measurement by my judgment. I generally took the measurement of the water plane before we finished the well; before we went down very deep. As soon as we struck the water plane I would take it; and then take it by frequent measurements during the boring. Except in a few instances we took the casing up right away. In those few cases where I waited until the next morning, I found very little change in the height of the plane of the water. Sometimes a few tenths difference only. So that when I waited over night and took the measurement of the water plane it only verified the first measurement. I have been at every one of the wells I described; I was not at all of them while they were being bored; I had to visit from one well to the other. I think there was one well, probably, I didn't go to until they finished it. I don't think I was at well 5 station 20 in the alfalfa field on Buena Vista street, at the time it was in process. I was there before the derrick was moved away; but I wasn't there at the time I think the well was bored. I took the record from the well-borer. The material that filled the interstices in the gravel and boulders was generally coarse sand; the strata of sand and gravel were sometimes separated by these strata or pockets of clay. Occasionally we found coarse gravel at certain depths, and at other times we found boulders; they were generally filled in with very coarse sand and fine gravel.

Occasionally it was fine sand, but not very often. I have done borings there before for the city—in the spring of '93—on
794 the mesa portion of this land sought to be condemned, and also on the lands to the north side of the river on the property owned by Mr. Brack, and also on lands to the east of the tract sought to be condemned, but off this land.

Mr. DUNN: May it please the court, for the purpose of this trip up the river, Mr. Friel is here and Mr. Bassell is here, and the sheriff is here and the jury are here. I would like the court to instruct——

The COURT: I am going to instruct the jury and the parties now, if they are all here, as to how they shall conduct this matter. I will instruct Mr. McMullen, the sheriff, later.

(Here the court instructed the jury and Messrs. Friel and Bassell,

engineers, concerning their trip to view the premises sought to be condemned.)

(Discussion between court and counsel.)

On March 22, 1896, in pursuance of the stipulation between the respective parties and under order of the court, the jury viewed the lands sought to be condemn-d and the vicinity.

The judge of said court who was trying the case had previously, after the commencement of the trial, by stipulation of the parties, also viewed said lands and vicinity.

FRED EATON, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

The measurements of the river and of the various diversions I gave the other day in my testimony, were made by the city engineer and two or three of his assistants. I measured the river at these points myself, yesterday. I didn't measure it at all the points yesterday, but all but one; that was measured by another party. The first place we measured it was at the head of the main supply ditch, there was 960 inches there. And then we measured it in the same ditch, where it leaves the river, and there was about 800 inches; that was 800 inches net. The next point we measured was in the water company's diver-
795 sion. We measured at the Crystal springs, and then we measured down at the reservoir, noting the waste on the way, through the gates, and so forth; giving us at the reservoir 966 inches. That is the surface and underground flow; the Chavez ditch was diverting 50 inches. Mr. Lorraine, at the same time we were making these measurements, he measured the river below. He can give you that. I have it; I can give you that, if you want it. By the measurement made by Mr. Lorraine, down at the lower section, at the narrows, there was 2,098 inches. Assuming that Mr. Lorraine's measurement at the narrows was correct, 2,098 inches, the total surface flow of the Los Angeles river was 3,914 inches yesterday; that is, net. Now, we are eliminating all the wastes in between, that would be remeasured unless we did, you know. If all these diversions had been turned out and allowed to run down the river, it should have measured 3,914 inches at the narrows, on the surface. The last measurement, that I testified to the other day, showed quite an increase below; a very material increase over the measurement at the narrows at this time. We didn't get through with our last measurement of the city water company's—the other day; we were switched off on to something else. There was a lot of water there that was measured in that lower estimate; that lower measurement. And was fully 150 inches at the upper end was measured. And then there was about 200 inches wasted in the water company's ditch there that we remeasured. And then there was an uncertainty. The amount of water that I gave the city engineer as being diverted by the underflow of the water works the other day was 700 inches. Now, from the measurements I made yesterday, there was only

about 300 being diverted by the underground works; that is a variable quantity. They have filtrating galleries, artificial beds, over
796 these galleries, that they run the surface water over. And there is times when they are not running that water over the galleries, that the underground pipes don't deliver as much. And it is difficult to tell just what that is, without measuring it down at the reservoir. The condition was yesterday that I measured 300 inches. There was 250 inches flowing over one of the beds of the Crystal Springs gallery, on the surface, but there was about 200 of it running down in a pipe that had a direct connection from the underground pipe to the surface; two pipes at least. The time when I measured the Crystal Springs underflow in the filtration galleries before, it was 400 inches greater than it was yesterday. That was about two years ago, and they must have had more water running then. These measurements were all made by myself on the ground; Mr. Compton and myself made the measurements.

Cross-examination.

By Mr. CHAPMAN:

I made these measurements yesterday. Two years before that I measured the water in the Crystal Springs Land and Water Company's pipe in a suit of The City of Los Angeles against Crystal Springs. The measurements were made a little before the trial, two or three months possibly, which was in November, 1893. We only measured the water once that was in the pipes—in all the pipes, only once that I ever measured it, excepting this time. I measured in all the pipes. I measured the water once, running in from the Crystal springs, prior to that. Yesterday I measured the water first at the head of the main supply ditch. We made that measurement in the ditch. We measured the water in the river below, near the eastern line of the Pomeroy and Hooker lands. We measured the water in the ditch, besides right at the head, down just where it leaves
797 the river bank. That is a mile, I guess, or more, below the head of the ditch. There was 800 inches there; and 960 at the head. We measured—well, it was a cross-section in the ditch, and we called it from 750 to 800 inches. That is where we made the second measurement. At the head of the ditch, where we made it 960, we measured it in a box, a kind of a flume that is in there. I make the amount that was being diverted yesterday by the city water company, both surface and underground flow, 966 inches. And that Chavez ditch at 50 inches. The narrows is just above the railroad bridge of the Southern Pacific going to San Francisco; they only have one, the Southern Pacific, at a point about 200 feet north of that. Commencing about 200 or 250 feet north of it, possibly 300 feet, and runs in a northeasterly direction across the valley adjoining the hills on the other side. Along the line of Columbus street. Across the valley there it is between 3,500 and 4,000 feet, on the saturated plane. I think the saturated plane is about 3,500 feet. Our measurements averaged along about two

o'clock in the day, I should say, the lower measurement at the water works was between four and five o'clock. That measurement was at the Los Angeles City Water Company's water works. The measurement of the river at the narrows was made, I think, some time possibly about noon. Mr. Lorraine can state.

M. J. LORRAINE, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My profession is civil engineer. Have been engaged in the practice of the profession 23 years. I measured the Los Angeles river just below the Southern Pacific bridge yesterday; that is inside the city limits. The surface flow of the Los Angeles river yesterday at that point was 2,072 miners' inches.

798 Cross-examination.

By Mr. CHAPMAN:

That was about one p. m.—a little after when I got through. I did not make any measurements there on the 21st, nor anywhere in that vicinity; I made measurements of several days, the last one before the 22nd; the last one before that on the 20th. On the 22nd I made it 2,027½. I have two measurements on the 19th, one gives 2,805 inches and the other 2,935½. I made all the measurements at the same place; those on the 19th were made about 4 o'clock p. m., and on the 22nd four p. m.

Redirect examination.

By Mr. DUNN:

I do not know why the flow was so much greater on the 19th than it was upon the 22nd and 23rd. I examined the city water company's ditch up above; I did not measure it; I did not examine the city supply ditch; I don't know that I know what the city supply ditch is. I didn't measure the main supply ditch which runs up onto this land in controversy. I didn't examine those ditches on that day.

EDWARD LOWNES, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My profession is civil and hydraulic engineer. I have practiced that profession fifteen years. I have been for the last 10 days or two weeks in the employ of the city of Los Angeles, taking some borings at the narrows just above the Southern Pacific bridge on Columbia street. I have been in charge of those borings. The map marked "Narrows of the Los Angeles river. Profile on line of wells in Columbus street. Showing cross-section of bed rock and plane of saturation"—represents the borings made there during

the last ten days, under my supervision. This map is made
799 from the notes that I kept; Mr. Lorraine was there at night.
The upper black line on this map represents the surface of the ground. The lower black line, shaded heavily with brown, represents bed rock. The small blue surface above the upper black line, at the left-hand side of the map, represents the cross-section of the Los Angeles river. The Los Angeles river at that point flows close to the side of the mountains, against the rock. I have my book of notes with me. These different wells are numbered on the map. Well No. 1 is next to the river. The first 7 feet was sandy loam; surface soil. And from 7 feet to 23 feet was in blue clay and sand, blue sand. From 23 to 32 feet was sand and boulders, a little coarser material. At 32 feet we reached fine coarse sand, and blue gravel; very much the same material as before, only a little different in texture. And that ran the same to 46 feet, where it was coarse blue sand. That ran to 49 feet, where we reached shale; a hard material that came out in flakes. And we ran 7 feet into that; bored 7 feet into that material; it was a blue shade similar to the material in the hills there. We encounter a good deal of that in the hills. It runs in strata. That material, in my opinion, was bed rock. We found water there the same level as the surface of the river, exactly there. It is right alongside of the river, very close to the river.

In well No. 2 there is 6 feet of the surface soil, and ten feet was fine sediment, a sort of clay; from 6 to 10 feet, 4 feet of it. 14 feet was fine sand. 17 feet sediment, a sort of loam and clay mixed. 19 feet fine sand. At 18 feet and 2 inches from the surface we reached water; surface water, the saturated plane. 25 feet, coarse gravel, from the size of a pea up to 2-inch cubes; small boulders. 30 feet was coarse sand. 33 feet, small boulders and sand and gravel mixed. 36 feet, coarse and fine sand mixed, a little finer
material. It ran coarse and fine strata. 43 feet, coarse gravel.
800 47 feet, coarse sand. 50 feet, the sand was a little finer. 52
feet, coarse gravel and sand. 57 feet, the same material we reached at 52, it ran the same. 59½ feet, tough yellow clay. At 60½ feet, blue fine sand and clay sediment. At 63½ feet was sand and gravel mixed. At 68½ feet, blue cemented sand. That was quite firm material. 69½ feet, tough blue clay. 71½ feet, sand and small boulders. 73½ feet, blue sand. And 75½, coarse gravel mixed with sand, sand and gravel mixed. 76½ feet, tough blue clay. 77½ feet, coarse gravel and sand. At 81½ feet, tough blue clay. 83 feet, blue sand. 86 feet, blue sand and gravel and boulders. At 98½ feet, sandstone, quite hard, blue sandstone. We bored, I guess, six hours on that. We couldn't get any further. That's what I took as bed rock. In my opinion it was bed rock. The well marked No. 4 was driven to a depth of 100 feet; number 3 was not bored; number 4 was the next well. We didn't bore well number 3. I mean by that that the well is there for somebody else to bore; the location is there. The wells were located about the same distance apart. These wells were bored pretty near 490 feet apart. The ones which would be number 3 and number 6 were left; were not

driven. All this is shown were driven. The formation in number was just about the same, they were driven from 74 feet to 100 feet in the bed rock. We drove the casing down to the bed rock as shown there, and then we drilled into that bed rock 25 feet without driving the casing in. The formation in number 5 and in number 7 was about the same general formation. In number 5 we were ordered to stop after getting down to bed rock, and we quit at that point. There was no particular reason, nothing with reference to the land itself. At number 7 we found bed rock at a depth of 75 feet from the surface; we went into the bed rock in that well 6 feet. I have some sam-
801 ples of the material which we found in those wells and designate as bed rock. (Witness produces same.) The formation which you show me is shale; that we found in well number 1; I call it bed rock. That is what we struck and bored 7 feet in, in well number 1.

Mr. DUNN: I will offer that in evidence, your honor.
(Same marked by the clerk Plaintiff's Ex. 22.)

Witness resumes: That is the same formation as the mountain higher up; there's a great deal of that formation in the hills there. The formation which I have in my hand now is sand rock, bed rock. It came from a depth of 98½ feet, well number 2. The whole strata was of that material.

(Offered in evidence and marked Plaintiff's Ex. 23.)

We drilled on it for about 6 hours; we couldn't get but about half a foot in. The formation which I have in my hand now is blue shale, and same from bed rock in well number 7; we bored in that about 6 feet. It was all the same material as that.

(Same offered in evidence and marked Plaintiff's Ex. 24.)

The material which I now hold in my hand is granite boulder. That came from the boulder and sand strata of No. 2. They were dark and light boulders, granite boulders, the same as you find in the Arroyo Seco. These are granite. We got some about 4 inches in diameter, about as large as we could get out through the pipe. I don't know how much larger they were.

(Same offered in evidence and marked Plaintiff's Exhibit 25.)

The plane of saturation, as shown on the map of the narrows, has a slight inclination towards the river, in a westerly direction. I think the elevation is marked on there; it is about 3 feet higher at the eastern end than it is at the river. (After examining the
802 map) about 5 feet; a little over four feet; the distance is 3,100 feet from the river, that is, from well number 7 to the river. Those wells are bored along a street named Columbus street. Where we start well No. 1, is only about a hundred feet above the Southern Pacific Railroad bridge, and we cross the railroad before boring the next well. The railroad crosses the line diagonally. The bed rock crops out on the left-hand side of the map, and also on the right-

hand side of the map—not of the map, but of the ground—it crops out about the ditch.

Mr. DUNN: May it please the court, I will offer in evidence the map entitled "The narrows of the Los Angeles river."

The same was introduced in evidence and a copy thereof marked Plaintiff's Exhibit 26 and made part hereof.

Witness resumes: The map below that map entitled "Diagram showing location of wells bored in Columbus street by the city of Los Angeles; also private wells in vicinity," shows the location upon which these wells were bored, and the location of the river and surrounding country there, and the hills. I didn't make this map; I have examined it; it shows the location of the wells correctly, with reference to the streets there, and the street lines; and with reference to the railroad and the river.

Cross-examination.

By Mr. CHAPMAN:

We bored into what I call the bed rock in well number 1, seven feet; we were all day there boring into that material. Well No. 2, we didn't get but about half a foot in that, we had a hand machine there, and we weren't in very good shape for drilling. It is very hard material. No. 3 is one that isn't bored. No. 4 we went into the bed rock 25 feet. We were about 24 hours continuously there, in the bed rock; we were about 48 hours altogether boring
803 the well. I have samples of the bed rock from well No. 4. (Witness produces same.) The material which you show me now is the material which I found at the bottom of well number 4.

(Same offered in evidence by Mr. Dunn and marked Plaintiff's Exhibit 27.)

We had a steam machine in well number 4; it was not the same machine with — we bored well number 2. I have lived in the city of Los Angeles ten years. I am a civil and hydraulic engineer. I have been engaged in the business of boring wells and running tunnels, before. In well No. 5 I said we didn't go to bed rock; didn't drill well No. 6. In well No. 7 we went to a depth of six feet in the bed rock. We drilled there I guess about 12 hours; we had a steam machine. That map upon which is indicated the vertical sections there of the wells is not made on a uniform scale; the vertical scale is greater than the horizontal. The vertical scale is uniform and the one is ten times larger than the other; the horizontal is one inch to 60 feet, and the other is one inch to six feet. I have been ten days there engaged in boring all of those wells; commenced on the 10th and quit I think it was the 20th. We worked day and night there, and Sundays. In well number 7 we struck water at 35 feet from the surface. I believe—36.8 feet. In well number 5, when I was there we struck it at 38 feet—we measured down to 38 feet and 8 inches from the surface, but that was just after the sand pump had been drawn out. I don't think that was

correct. It was measured afterwards, but I don't know what that measurement was. I didn't take it. To make the profile of the surface of the ground levels were run over the ground, just the same as you would run levels over a street, from one end of it to the other; but I didn't make the survey of the surface. I haven't testified to that;
804 didn't do anything but keep the borings. We strike the East Side ditch right on the prolongation of Columbus street, if Columbus street—Columbus street doesn't run that far. If prolonged—where it strikes the ditch—prolonged. The ditch from the termination of Columbus street is about a thousand feet, I think. We did not make any borings below this. Columbus street, in the river bottom anywhere. The first well we made was not in Columbus street. That was the easterly prolongation of Columbus street. Columbus street does not run east that far—or west, I mean, that far. We made no borings only along this line. I haven't tried it in the river bed below there. I have been here ten years. I know where the East Side Spring Water Company pumps the water to the reservoir on Boyle Heights near the hospital. I have never been right to the spot, but I know about where it is. Where I did this boring must be directly north of that, a mile and a half at least, I should think. I know where the Beaudry water system pumped the water that supplied the hills to the west of the city for a number of years. I know where the reservoir is up there near the Sisters' hospital. I know about where they pumped the water from the river bottom there—where the wells were. I think that's right close there to where I did this boring—my recollection of that place—pretty close; it is south, I think. My recollection is not distinct on that. That was done away with about a year after I came here, I think. I don't remember much about the Beaudry system. The Citizens' Water Company must have taken charge of it seven or eight years ago, '87. I guess nine years ago. The only boring that we could tell whether there was much water in was well number 5. We didn't get down to bed rock on that and there wasn't much water on that. That is it didn't run very fast. We had to keep pouring
805 water in to cover the drill or sand pump. When we would pull it out it would exhaust the water and it wouldn't run in again. The same way on the others, till we got down deep, and when we got down—of course we had 20 or 30 feet of water over the point that we were drilling and that kept supplied most of the material after we got down to the water was sand and gravel, different sizes, a great many boulders. A great deal of fine sand and coarse sand. Seemed to be mixed together. That bed rock came up through the sand pump in pieces. We drilled it first; drilled it with a steel drill, and then we sand-pumped—after we would drill a piece we would sand-pump; and we got it up with the sand pump. We had a six-inch sand pump in well number 4, and also in well number 7 an 8-inch well. Well number 2 was 7-inch. All the others are 7-inch. Since that rock was gotten up, or the material which I call the bed rock, it has hardened in the atmosphere; that shale is a good deal harder since we took it out. The sand is harder too on exposure—the cemented sand. You can break it with

your fingers, still. You can break that shale with your fingers. You can break the sand also. This rock was quite hard when we took it out. We drilled into it with the drill. Those rocks that I showed you came right off the surface. They were flaked off of the surface, undoubtedly; but after we got down farther we didn't get any large pieces, but we got smaller pieces. The first piece, I think, was flaked off of the surface. We got one piece that was quite large. It was a sort of a saucer shape. We drilled on it for several hours there. It came up in the sand pump. We worked on that with the sand pump and it broke off and came up from the bottom in the sand pump. We didn't bore any wells at any point intermediate to those that I have marked on the map. We could tell quite accurately, I think, where this shale formation
806 leaves off and where that sandstone begins, by the materials we would bring up in the sand pump. In well number 1 we were in shale all the time, we didn't strike anything but shale. In well number 2 we found sand rock. We didn't find that same shale that we found in well number 1. Well number 1 was bored right down by the base of the mountain, and we struck the shale when our well, in its perpendicular descent, struck the mountain base. After that we found shale in well number 7 at a depth of about 75 feet from the surface. We brought up this piece that we had as a sample; we got that piece. That was a piece that came from right near the bottom. That was quite soft when it came up; you could break it with your hands—break pieces off of it. On each extremity we found the shale; we didn't find any in this well number 2 nor in 4; in 5 we didn't go to bed rock; 7 is the one where we found the shale on the eastern extremity. We bored in the shale in number 7 about 6 feet. We didn't go through it. We never did get to the sand rock on that side; and I think that the shale is the bed rock; and I have reason to think that the sand rock is the bed rock. I know we didn't strike a boulder where we got these pieces out, because it didn't act like boulders. We didn't have any rounder surfaces. The boulders that we got—we broke pieces off of the boulders, and we would have a rounded surface, and you could see where it was broken from the boulder. Every time we got granite boulders we got it in that shape; and on this we had no rounded surface whatever; it was stratified. The reason I think it was bed rock it's the same material that's in the hills—material that I am quite familiar with. The tunnel that was run through alongside the railroad there; I have been through that tunnel. Spent ten days in it one time. Find the same material there. Shale and sandstone and strata. It's evidently bed rock, because it is
807 all bed rock there, that hill, I have been through there. That tunnel is the Zanja Madre tunnel, the old tunnel. It's the tunnel that runs above Buena Vista Street bridge, from above the Southern Pacific bridge to the Buena Vista Street bridge, a distance of about 3,800 feet long. That sandstone was in stratas; they were quite thin strata of sandstone; a foot or foot and a half. We penetrated the sandstone in well number 2 about a half a foot and in well number 5 we went 25 feet. I guess well number 4 is the one I

mean. We have got so many well- there that are not down. We encountered the same material in well number 4, as we sunk those wells—at about 98 feet, struck sandstone—98½ feet. We encountered it at 75 feet in well number 4. We didn't strike any stratum of the sandstone that we went through as we were boring the well. In well number 4 we went through hard and soft stratas, but it was all sandstone; pretty much the same as in the bottom, only it was harder and softer. We didn't get through it; we went through stratas I said that were harder and softer, but we didn't go entirely through it; we never went through the sandstone entirely. I mean in this that you take to the bed rock. There was some portions of it that were harder than other portions. We didn't find any more gravel and boulders after we got into the sandstone; not at the bed rock. We didn't find any more sandstone before we got down to this depth of 98 or 75 feet. These wells as marked on the map were laid off about 490 feet apart. We omitted to bore number 3 and number 6. We didn't start. And number 5 we only went about half way through that sand and gravel so that between numbers 2 and 4 the distance is about 980 feet; and between 5 and 7 it is about the same distance—it's 990 exactly. I remember that. Between 4 and 7 there is a space of about three times 490 that we did not
808 sink any of the wells to this bed rock. I had charge of the well-boring in the daytime. I was there most of the time. I was under the direction of the city engineer. When I was boring this well 5 he didn't direct me where I should stop. He told me when I should stop, but he didn't say to what depth I should go. The place was just wherever we were when he told us to stop. He told us to stop work; I suppose that he was in a hurry to get these notes; that was the reason he ordered the work stopped; I know that was the reason. I am not positive of it; I think that was the reason. I didn't hear him say; he didn't give me any reason; just ordered the work stopped. We were boring on number 2 at the time, and setting up for number 6. Didn't bore on number 6. I mean we were boring on number 2 when he told us to stop boring on number 5. He stopped the whole work. We were boring two wells there—we were boring three most of the time. We were moving machines on from one well to the other at that time.

Redirect examination.

By Mr. DUNN:

We did not, at any point above the line which I call bed rock, strike any of the same material that is in the bed rock. I worked for ten days at one stretch in a tunnel. That is a tunnel that runs both parallel with the river, inside of the railroad, not parallel with the cross-section, but at right angles. It is a fact that the formation of the hills all round there, and on each side is of alternate strata, a sandstone and this blue shale. It is a fact that the bed rock in that tunnel that I speak of is of alternate strata of blue shale and sandstone.

Mr. VARIEL: We object as leading.

809 The WITNESS: And of different grades of hardness.

The COURT: Objection sustained.

M. J. LORRAINE recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I was in charge of those wells during the night borings. I kept a record of the wells myself; observed them at night when I left and in the morning when I got back, and during the night; that is all but well number 1. I had nothing to do with that. The rest of them I worked on the night work. I know what the lower black line heavily shaded in brown is intended to designate; it is intended to indicate bed rock on this map. I was not present at any time when they struck bed rock, what is marked here as bed rock, in well number 2. I was present while they were working on it. I saw the material that came up on number 2. I was present while they were working on the bed rock there. We worked all night on it. I was present at the bed rock—of most of those in the bed rock; saw the material that came up; I took out some of the material. The material was a little softer in places. Some harder and some softer strata. There was no sand or gravel or anything of that kind in it. I was present when they bored number 7 in the bed rock. The material in the bed rock there was shale, I believe. It was all of the same character at that point while I was there. I took some of the material from that; I took out the first shale I believe. I have examined the material that has been submitted here. It is the material that was taken out. The formation in the bed of those two wells, with which I am familiar, is the same formation as the hills on the south side of the river. I don't know about the hill on that side. The hill on the south side is of the same formation as this bed rock; alternate layers of shale and sandstone. I think this material that is designated by the black
810 brown shaded line is the bed rock. I measured well number 2 as it was going down; not when it got to the bottom. I don't think I saw the material they took out. I don't think I have seen that before. (Referring to a piece of rock handed witness.) It is of the same character. This looks a good deal like what came out of number 4. It is like that which came out of number 4. I don't think I saw what came out of number 2 at the bottom; I was away at that time.

Cross-examination.

By Mr. CHAPMAN:

I say I saw number 4 and 7; the sand rock had not hardened any; the shale has hardened some. The sand rock was not saturated with water when we brought it up. I saw the formation in the hole along parallel with the Southern Pacific Railroad track, on the south side; I didn't go in the tunnel; there are passageways going into the tunnel; I saw it at the mouth of those. I judge it is a little

lower, if anything, not much, than the street that is marked "bed rock" on that diagram. The hills on the south side where I saw the material are a little lower. The tunnels on the south side are not lower than the bottom marked "bed rock," but the surface of the ground on that side of the river. I could point out on that diagram about the elevation. Well, about this elevation. (Indicating on diagram. About 16 to 18 feet above the river. I say that that formation in the hill is shale and sand rock alternating. The one is superimposed upon the other. I don't recall to mind now which is found first in the hills; they alternate; it is first one and then the other. I think it is different in different places as to which is struck first. That map was made in the city engineer's office; I didn't have anything to do with it. I can suppose what those
811 marks underneath the brown line there are supposed to indicate, that is all; I don't know positively.

Redirect examination.

By Mr. DUNN:

In giving the measurement of the water up there yesterday I gave it 2,072 inches; that is the water flowing down the river; there is some more water beside that escaping through the dam—about 26 inches; it varies with the height of the water in the river. That would make about 2,100 inches altogether.

Mr. DUNN: I think that is all. I want, at this time, in order that the other side may have plenty of time—we stopped up those wells and stopped them up as tight as we could with wood at the top, in order that they might not be interfered with. I know the defendants have gotten into them to some extent, which we are perfectly willing they should do. Mr. Friel tells me they have examined them very thoroughly. But if they have not, we stopped them up for the purpose of offering now to let the defendants have access to all those wells. They are bored in a public street, which, of course, is under the control of the city to that extent. And to offer to allow defendants to bore any other wells they might want to bore on that line, and to have the use of the street for that purpose; and make any examination of these wells that they want to, or bore any others, or finish No. 5 that is started, if they wish. In short, to take possession of them, if they would like to, and make any further investigation that they see fit. We would like the privilege of having somebody present, as they had when we were boring; they had that privilege, I think, without consulting us. (Discussion.)

J. O. MARSH called for plaintiff, sworn, and testified substantially as follows:

812 By Mr. DUNN:

I am the chief draughtsman in the city engineer's office; my profession is draughtsman. I have been such nine years. This Exhibit No. 26 of plaintiff's marked "Narrows of the Los Angeles river," was made under my supervision, from the notes

of Mr. Lownes and Mr. Lorraine. Mr. Hamlin actually made the map. I have checked the map up with the notes, and it checks up with the notes made by Mr. Lownes and Mr. Lorraine. I should say, together with the notes of the—the line made by Mr. Street; the survey. Of the line and profile surveys, and it checks up with all those notes, made by the actual surveys on the ground. This other map was made in the same manner; I have checked this map, and it checks up properly with surveys made upon the ground.

GERVAISE PURCELL, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My profession is civil engineer. I have practiced the profession over 28 years. I practiced it part of the time in the old country, and in the Eastern States here, from '68, for five years; under the Japanese government for six years; and from '80 principally in California, although I was one year in Oregon. Since '80 I have practiced civil engineering and hydraulic engineering on the coast. I have lived in the county of Los Angeles since August, '80. I have made three critical examinations of the Los Angeles river for this city, and am familiar with it I think I first examined the Los Angeles river and its surroundings in '93 for the Crystal Springs suit. There were a great many borings made at that time under our direction. I was one of the engineers employed by the city then to investigate the matter. I have been employed by the city recently to investigate the matter with reference to this suit, and I have so investigated it. The source of supply of the sur-
813 face flow of the Los Angeles river is the mountain ranges of the Big Tejunga, the Little Tejunga and the Pacoima and some of the foot-hills around the San Fernando valley. So far as my investigations go, there is 459 and a fraction, in round numbers, miles in the watershed tributary to the river. I don't say that all produces water to make the flow, but there is that many tributary; there is that number of miles above this land in dispute. I have investigated the question as to what the rainfall has been on this watershed, or different portions of it. I have got the sheet of record of rainfalls, obtained from the Government and other sources. I have the memorandum with me. This memorandum is collated, I understand, by the Government, Sergeant Franklin here, from different returns he gets, both from the Government investigations and the private investigations, such as the Southern Pacific and Mr. Van Nuys and others. Some of them, I believe, are made actually by the Government. I checked the testimony of Mr. Eaton from this table; and it is collated from all the different sources of information which I am able to procure. The greatest rainfall for any year at the different points where the rainfall has been taken in that watershed, is in the year '84. In Los Angeles there was 40.5; at Newhall, at an elevation of 1,268 feet, it was 44.2; at Ravenna, at an elevation of 2,358 feet, it is 28.09; at San Fernando, at an eleva-

tion of 1,065, it is 37.02; and kept by Mr. Van Nuys at the home ranch, at 770 feet elevation, it is 33.62. The least rainfall that I find recorded here is in '81. Los Angeles, 5.6; at Newhall, 8.23; Ravenna, 3.36; San Fernando, 5.30; Van Nuys' home ranch, 3.45. Supposing the Los Angeles river, surface flow, is practically uniform year in and year out, excepting, of course, in times of rain and for a little time immediately after rains, but that is practically uniform, regardless of whether the preceding winter be dry or wet, that
814 would be a governing factor that would indicate that the supply by which the surface and underflow was made was governed by the least rainfall; because it couldn't exceed it; if it exceeded the amount given by the least rainfall, why, then the river would fall off during a wet season. That is to say, the flow of the river is maintained in a state of equilibrium by certain gravel beds that lie to the northerly portion of it; and the absorptive capacity of those beds governs the flow of the river. Now, if we find that the river doesn't fall off during a dry or a minimum year, we feel satisfied then that the absorptive capacity of those beds cannot exceed what the minimum year would give; although they might be less. Supposing we find the river does not increase in its flow during a summer after a very wet winter, that would simply prove that a greater amount run down in the flood than there did during a year when there was smaller rain. That would prove to me that the great excess which fell in the winter was discharged during the flood season. In computing the capacity of the underflow and surface flow of this stream, and the capacity of the sources, I figure it up the greatest amount of discharge during the uniform summer flow that that watershed would give on the mimimum year; and I say that, in my opinion, the flow of the upper and lower portion of that river cannot be any greater, although it may be less. I arrived at the conclusion that 5,200 inches was the total amount of water flowing through that ground at the lower end of the Pomeroy and Hooker land, both above and below. I can give you the figures and the way I got it. There are 460 square miles of watershed, and of that one-third of it is rolling plain; that will give no return. Investigation has shown that plant life, evapora-ion and general agricultural uses will use up about 12 inches of rainfall, if it gets it. Now, in the minimum year, where there is only
815 on that valley somewhere in the neighborhood of 3½ inches, why, of course, there would be nothing left to run off. That is certain. Now, it is a well-known hydrographical fact that, as the cultivated land increases, the fall of rain increases. And Mr. Lippincott stated here on the coast there is a general law that governs that; and that is that about .60 or .6 of an inch of rain falls for every extra hundred feet of elevation. Working on this basis, and taking the average height of that shed as given here in testimony, at 2,700 feet, we get 11.58 of rainfall on the 306 square miles that constitute the mountain shed. Now, 11.6 inches, or .58, is .97 of a foot. Multiplying that we get—and reducing it to acre feet—that is to say a foot over each acre in the shed—we get 189,764.8 acre feet of water. Now, of that 40 per cent. will be absorbed. The balance

will go to waste, according to the best authorities; so multiplying 189,764.8 acre feet by 40, and dividing by 730 to get the daily flow, we get 104 cubic feet per second; which multiplied by 50—50 miners' inches in the cubic foot—gives 5,200 miners' inches It is my opinion there is about 5,200 miners' inches of normal run-off from this watershed during a minimum year. That normal run-off, which includes underground water and the surface flow of the stream, would not be any greater in a maximum year than it would in a minimum year, because, otherwise, you would have a variation in the flow of that river. If the absorptive capacity of those gravel beds was a variable quantity, you would have a variable flow in the river. In my opinion, this great excess of water in the maximum year runs off in flood during winter. I know about the average surface flow of the Los Angeles river; we made some measurements there and at the bottom of the Hooker land, taking the supply ditch into consideration. Well, I have the items right here. It is about 2,500 inches all told. That is at the east
816 end of the Hooker land, that is the water which flows in the river at the east end of the Hooker land, and also which flows in the city ditch, having been taken from the river; added together making about 2,500 inches. Well, without the city ditches there is 2,059 miners' inches, according to my own measurement. That measurement was made, I think, the 19th of February. The city ditch was running then. It was running at the upper end, 530 miners' inches; and at the lower end, 410 inches. There was a loss between the two places. That would make an approximate figure of 2,500 inches for the surface flow at that point. At the lower end, 410.8 miners' inches; you might say 411. That would leave, in my opinion, flowing under ground, from this watershed at the point in the valley on the Hooker land, opposite that, between there and the mountains, about 2,500 inches. I know by investigation what the total surface flow of the Los Angeles river is, including the diversions from it, and taking the flow at the point where the cross-section at the narrows is made, but not by my own measurement. There is watershed all the way down; there is that Verdugo watershed; it is very productive. The narrowing of the section at the narrows would tend to throw the underground water to the surface. You can't tap a system at the bottom and not injure the water on the top. Supposing the underground water was to be taken out back in the valley, at the Pomeroy and Hooker land, and points opposite it—supposing the underground flow to be taken out, it would certainly diminish the surface flow lower down. Supposing the cross-section at the Pomeroy and Hooker land to be 123 feet deep, pretty near all of this 2,700 inches that you could get above the plane where you entered with the tunnel below, which I believe is about 3 feet below the surface, could, in my opinion, be taken out on the land by gravity.
817 I think the majority of the water gets down into that neck; the trend is that way; and eventually you would take out all that there was to take; as it was served by nature. And you could only take such a proportion as would be in the water plane above

the elevation of this tunnel. And the water which was down there and from there down to the depth of 123 feet, you couldn't reach except by pumping. Supposing you were to run a tunnel in there on that land, as indicated on Defendants' Exhibit "F," through in the water plane and take the water out, from the nature of the material I think you would undoubtedly affect the surface flow of the Los Angeles river. I wouldn't undertake to run a tunnel through there and take out water in any quantity from that land, because I don't believe it can be done without affecting the surface flow of the Los Angeles river.

Mr. CHAPMAN: Well, we move to strike out the answer, as not responsive.

The COURT: The latter part of it, I think, strictly responsive. The question called for his opinion. You can strike out that portion of it where he says that he wouldn't undertake to do it.

Witness resumes: Well, I ought to have said I wouldn't undertake to recommend it; that is what I meant; because I don't believe it could be done. Water taken from the underground flow upon this land must eventually affect that on the surface. It must eventually lower the water plane. The effect of lowering the water plane generally, would be to diminish the surface flow of the Los Angeles river. The water from below supports the surface flow of the Los Angeles river; it gets its water from below, because you will find the water rises in the bottom of the river. If you were, by any process, to take the water from the soil below the river you would diminish the river just in that proportion, because it gets its supply from below. That water that comes into the river
818 in its normal summer flow is due to the fact that the water, that runs in the underground streams from the mountain watershed, strikes the Cahuenga hills there and in order to gather head to get velocity to get off, why, it raises to the surface.

I stated the reason of the increase of the river between this land and the cross-section. That reason was the water that came in from the intermediate watersheds the Verdugo. The other reason was the smallness of the section having to carry the same amount of water as the larger section forced it to the surface. The section narrowing up, would raise the water to the surface. I have not figured as to the amount of water running under ground through that cross-section. The waters that come out of the Pacoima, the Little Tejunga and the Big Tejunga, take a southerly direction there on account of the natural fall of the land, following the natural grade line. Supposing the San Fernando valley to be practically flat, the water from that watershed would first probably work out a little farther than they do, and eventually spring around until they piled up against those southern hills there. If the San Fernando basin was all perfectly flat and without grade, without any inclination in any direction, the effect of this water of those watersheds flowing into it, would be that it would absorb water alike all over it until it became thoroughly filled and saturated: then it would overflow in the weakest direction. I think that water comes down

and follows the natural channel formed by the flood and works along until gradually the absorptive condition of the ground takes all the water and it maintains that channel until some succeeding flood brings down debris and covers it over, and then it will take a new channel, possibly, a little to one side, and the same thing will occur one after the other. I shouldn't think that the flow of the water southwest in that line, as indicated by
819 the washes on the various maps, is of the same velocity at all points. Where there are old channels that have originally been surface channels and been covered up by the debris from the hills and afterwards became underground channels, the flow in those underground channels is checked by the material that has lodged in there, so that the velocity becomes in proportion to the amount of check. First, the amount of check caused by this debris that is lodged in there. I think that is very decidedly different at different points. The effect of driving tunnels under this land, upon the surface flow of the river, in my opinion—if you drove to the north side of the river there, for instance, you would intercept those underground streams and carry them off; and if your grade was sufficient, you would carry them off before they would have any effect upon the surface flow of the river. If you would carry those waters off—those water- are what make the surface flow—if you carry those waters off by a tunnel, you would diminish the surface flow. The effect, in my opinion, if a tunnel be constructed following the north line of the land sought to be condemned all the way around, constructing it to the depth of 30 feet below the water bed, would be undoubtedly to diminish the flow of the river, and we would get considerable water; you would tap the main feeders of that river. I made some figures on the outflow of the waters from the Verdugo watershed into the Los Angeles river, and it is about 700 inches. Between seven and eight hundred inches. As to the surface increase between the Pomeroy and Hooker land, and this cross-section, there is 2,500 inches on the surface in one place and there is 4,000 in another; there would be 1,500 inches of increase. I think 750 inches of that increase comes in from the Verdugo canyon. I think all that comes to the surface, owing to the smaller cross-section of the river at this point here. That
820 would leave an increase of 750 inches, which I think comes from the underground flow from the watershed of the Pacoima, Big and Little Tejunga being forced up all the way down the river.

Cross-examination.

By Mr. CHAPMAN:

I came to the United States in 1868; I came to California in the year '80, and I left California in the year '91, for three months, and went over to Europe. With the exceptions of about a year in Oregon and three months in London, I have lived here all the time. I have been in the employ of the city on three occasions, for the purpose of investigating this section of the country. The first one,

Crystal springs, I think that was 1893; that I am not sure of. I couldn't exactly say how long I was engaged in that investigation at that time, but some considerable time; possibly when we were first employed the time the suit came on, it must have been, to the best of my recollection, six or eight months. My investigations upon that occasion were made right around the Crystal springs proper, and then we took in the general surroundings. It is not my recollection that the conditions there are somewhat different as to the underground formation from what they are up on the Pomeroy and Hooker tract; I think they are pretty similar. We had a number of wells bored around the Crystal springs; I don't remember how many. The material we found, I think, was generally a material such as is accumulated by this class of river. I don't know whether I went quite as far as the Pomeroy and Hooker tract, upon that occasion, because I didn't at that time know just exactly what Pomeroy and Hooker did own. I was possibly up on the Crystal Springs tract, during that investigation for the city, four times, but I wouldn't be sure. I was next employed by the city
821 in the Spillman case; that was about a year ago. Upon that occasion we went over the Spillman property; we started in to make a much closer investigation with borings and so forth, and in the meantime the city attorney made a stipulation with Mr. Spillman that ruled out the necessity on there and that was stopped; how much was done I don't know. We went up there and advised certain investigations and they were put in motion and we proceeded in the meantime and a stipulation was made with Mr. Spillman which ruled out the necessity of entering the matter any further and it was dropped. We didn't carry out that plan. I wouldn't be sure whether there were any wells bored or not. I forget where the Spillman property we were investigating was; it was just above the Crystal springs, pretty nearly opposite Tropico. The third time I was employed by the city was for the purpose of making investigations for this trial. My investigations in that direction and the testimony of Mr. Eaton here, leads me to believe that the water that flows in the Los Angeles river proper, is a pretty constant quantity. Beyond Mr. Eaton's testimony, I made some inquiries from Mr. Schuyler, who was acquainted with the river some years ago, and I remember way back, I think it was in 1883, looking through a case of the court that precedes the superior court, I think it was called the judicial court, I am not sure, and my recollection, your honor, is that the amount of water given was about 50 cubic feet, which would seem to show about 2,500 inches, about the same as there is now. I couldn't say positively where that measurement was made, because I don't know. I of course have my own opinion, I knew the flow to be pretty constant, I said, as far as I could ascertain, from inquiry from those who know best; that is the state of the thing. It is about three years since I was employed by the city to make these investigations; and I knew
822 the Los Angeles river a long time before that. I had paid attention to the flow in the Los Angeles river myself, in a general way, certainly. I never made any measurement in the Los

Angeles river at all until I did so within the last few weeks, only eye measurements. Since I have been employed on this action, I measured it up at the upper end of this tract and at the lower end, and I measured the main supply ditch. I also made some measurements in Mr. Hooker's development. I made those measurements myself, that you are talking about now, somewhere along the 19th of February; that is my recollection. I measured the water in the main supply ditch. I have testified to those measurements already; can tell you again by referring. (Refers to memorandum.) The main supply ditch at the upper end was 532 miners' inches. Then at the second weir, which is where it turns around from the river and a little above the Pomeroy and Hooker cut, 521 miners' inches. Then the third weir, 452.5, and the fourth weir, which is the lowest down of all, 410.8. I measured the long cut on the Pomeroy and Hooker tract just where it comes out, where it goes towards the river, the end of the cut where it connects with the river—I am talking about the water; I didn't measure the cut at all. The weir ditch at the lower Hooker development 128.85 miner's inches. That was just at the mouth of the cut. I didn't measure the Los Angeles river at all. I was measuring the water that run through that cut. In the river I measured lower down, at the lower *down, at the lower* end of the Hooker tract. I found there 2,059 miners' inches. Upon that occasion I measured the river at the upper end of the Hooker land; that was above the main supply ditch. I found there 1,146 miners' inches. The difference between the two was 913 inches; that is the amount of water that the river takes up through that tract.

823 I only partially measured those two weirs that I speak of, but the increase was 913 inches. That was on the Pomeroy and Hooker tract. I didn't measure the water in the river below that. I never measured the water in the river below that. To get at my estimate of the rainfall in this watershed, I took the lowest rainfall record at an elevation of 770 feet, which is in the year 1881. That is at the point called Van Nuys' home ranch, and that is 3.45 inches. Then I calculated the increase according to the elevation, by Lippincott's rule; that gave me for the rainfall 11.58, you might say 11.6. I have made my figures upon that basis as constituting the rainfall of that watershed for that particular year. I made a good many other calculations at different times; I didn't calculate the average rainfall, but of course it is an easy matter to figure the average rainfall there in San Fernando. On the plain it is 15.21 according to this here. And if you were to apply Mr. Lippincott's rule, which corresponds, I may say, very well with other rules—to apply Mr. Lippincott's rule I took the lowest rainfall at the elevation of 750, and, beginning with that elevation and that rainfall, I make my estimate of the average rainfall of that watershed for that particular year, not the average rainfall. I made an estimate of the average rainfall of that watershed; I have not got it here, because I did not figure the out-run of the whole river by the average rainfall. A chain is no stronger than its weakest link, and the summer flow of that river being constant in character, caused by the minimum rainfall—that is according to the facts. I didn't as-

sume anything as the average rainfall of that section, because we have a rain table right here and the average rainfall in that plain this rain table states—I did make a computation of the average rainfall of the Los Angeles River watershed; I have not got those figures with me, but I can figure them just the same way. I have not assumed that the flow of the Los Angeles river is
824 about 5,200 inches, and I have not so testified. I say that the most that that river can flow, top and bottom, because I include the underflow, cannot exceed 5,200 inches. I don't state that it is any such amount; it is probably a good deal less; as to how much less, that is a matter that would require a very exhaustive and extensive engineering exploration and a long time to tell. We haven't got the data. I have not had the data to make that computation accurately. I tell you, that assuming that the Los Angeles river is a constant quantity, that then from that it indicated to me that those gravel beds are of a limited capacity, and that capacity is measured by the minimum rainfall. The minimum flow in the year of the smallest rainfall; that is what I have assumed. The difference from the average and the smallest rainfall, of course, is in favor of the average, and the average would show a greater rainfall than the minimum. And the average largest rainfall would show a still greater difference from the year of the smallest rainfall. You would have the minimum, the average and the maximum is the greatest. My theory is not that all that falls over this lowest rainfall must run off on the surface; I didn't say so; I have no such theory. I have stated exactly what I believe. I am very willing to explain just exactly what I consider. I said this morning that the fact that the ordinary summer normal flow of the Los Angeles river is a constant quantity, indicates that the capacity and absorption of those gravel beds that govern that river flow are limited by the minimum rainfall, and therefore whatever falls over and above the minimum rainfall, must find its way out of there and be dissipated by some other means; you might call it waste. I take it that the year that the Los Angeles river in its ordinary summer flow in the year of the smallest rainfall is the
825 index to the capacity of the underground reservoirs by which it is supplied; in other words, it is the governing factor; it determines the fact that the river cannot be any more. It might fall vastly below that if you had any lesser rainfall, or if you had no rainfall at all for a series of years you possibly might have no river. Might have no river, but you can't have any more. That leads necessarily to the conclusion that all that falls over that minimum average flow of the Los Angeles river must be done away with some other way than through the Los Angeles river; that cannot increase; it must either go in flood or in agricultural uses. That theory assumes that the minimum rainfall is sufficient to keep those gravel beds full enough to supply this stream; that is the point I want to make. If the minimum rainfall should fall below that, then the stream would decrease; that is to say, if the stream took all that the minimum gave, but I have on proof that it does. There is no means of measuring with per-

fect accuracy the underflow of the river. I have testified here that when we reach this celebrated cross-section here, that then whatever has not been brought to the surface before, comes to the surface, but that has nothing to do with the point. I say, if you put through a smaller cross-section what you have previously put through a larger cross-section the smaller one will force it to the surface. The smaller one in that event in order to have that necessary result, must be composed of different materials, or the same material as the other, substantially. It would be a question of the cross-section and velocity. I assume that the minimum rainfall is sufficient to fill up these gravel beds to the extent of all they can hold, because of the assumption that was put to me that the ordinary normal summer flow of the river does not change. I didn't mean you to infer at all that if there were an enormous rainfall, for aught I know to the contrary, there may be some other means by which
826 it may flow off under ground rather than to go to the Los Angeles river; I don't know of anything to indicate it. If the rainfall should be greatly above the minimum quantity and the summer flow of the Los Angeles river remaining the same, that quantity over and above the minimum must find its way off in some other way than in the Los Angeles river; it goes off in the winter flood. That is on the same theory that if you get a tub full of water you can pour all the water you want to on top of it and it will run off; you have only got the tub full; and all that goes in the tub over and above what keeps it full, must go off. To my estimation the winter's floods in the Los Angeles river vary very much; I have known it for about 15 years. Sometimes a big flood and sometimes a little flood and sometimes no flood. If those gravel beds have not their full amount of absorptive demand the balance will run off in flood, because it can't take any more. It can't take any more. Not in the gravel bed. And the amount that the gravel bed would hold and keep supplying would not depend anything upon the capacity of the soil below and further down the river to carry it off; I don't see that it would. I don't think I made any calculations upon the quantity of water that would fall on this watershed in the years of the greatest rainfall; I may have; I made a great many figures and made up my mind as to the way to get at as near as we could what this river would supply in the summer, and those calculations I calculated a good many times. The greatest flood in this country that I know of, in Los Angeles city, I think was in 1884. I won't guarantee; it was in 1889 and 1884, the rainfall was pretty close together. I remember in 1884 it was a tremendous flood because I couldn't get into town myself for about a couple of weeks. The total amount of rainfall in the city of Los Angeles that year was forty inches and a half, according to this
827 table. At the Van Nuys station at that time it was 33.62 inches, about six inches less. The year of the next greatest rainfall according to our record here is 1889. That was in Los Angeles city, 33.30; and the year of the next greatest rainfall was '88; that was a pretty good year; that was 20.9. The year '90 was 12.6; that is Los Angeles I am talking about. At Van Nuys', there was

7.64; Newhall was 14.1. I have no recollection of there being a very severe flood in 1890, at all; it might be though. I think I was not in California in '92. No, in '92 I went over to Europe in the winter of '91, and didn't come back until February, '92; and I don't remember about these things; there might have been a flood, however. The rainfall in '92 in Los Angeles city was 18.72. That is a little over the average. The rainfall for the same year at Van Nuys' was 14.26 inches. I have never made any calculations upon how long it would take the Los Angeles river in the city of Los Angeles to carry off the flood of 1884 or '89, that I have been speaking of upon my theory. I consider that I have verified my theory by careful inquiry. I have satisfied myself that the normal summer flow of that river is constant. If I had come up against anything that seemed to contradict it I would have investigated it, and very carefully, but I have not. I have not tried my best to steer clear of it; I have done nothing of the kind. I am pretty well acquainted with Los Angeles county. I know something about this section of country south of here along through the Ballona ranch to the sea, and the Cienaga ranch; I have been over them. The water that goes into those places comes partly of course from the Los Angeles river. It partly comes from the return waters from irrigation, which has raised the plane of saturation over all the lowlands in this country to my knowledge. From the use of water for irrigation on the higher slopes. I have not made consider-
828 able inquiry of anybody whether there was any more water in Ballona creek or in the Cienega ranch than there was twenty-five years ago. I think it is an admitted fact that all those lands up in San Fernando and the Providencia country have been laid out in orchards and cultivated a good deal more than twenty years ago. They have also been cultivated in grain to a vastly greater extent. The cultivation of the surface of the land of course prevents so much water running off. It enables it to receive the amount with greater rapidity, and I should think retain it longer. Whether a greater amount of water goes in this general underground flow by reason of the cultivation of the soil than when this whole country was a stock range and tramped down, would largely depend upon the quality of the soil—if it was part adobe soil—I know the quality in a general way. The material at Messrs. Pomeroy and Hooker's place is about the same, as it is upon the Crystal springs. I don't think you can pack that class of soil very much by running stock on it. I know what is testified to here on the stand. That is all I know about there being more water flowing in the Los Angeles river at the north boundary of the city today than there was twenty years ago; I have made a good many inquiries and talked at different times with parties who are acquainted with that river, and as near as I could find out, the general statements bear it out that the normal flow of that river in summer is a constant quantity. I was here in the fall of '80; in August—June I think. In February, 1881, I went to Oregon. I think that if water were developed on this Pomeroy and Hooker tract and carried away to some other place it would diminish the flow of the river; I

think the surface flow of the river is intimately connected with the underground flow. If you take away the underground it would diminish the surface. I presume I was of the same opinion about
829 the development of the Crystal Springs Land and Water Company around Crystal springs. If I recollect the Crystal springs rightly it was whether they were taking the water flow or whether they were taking something that was not the river flow, and I held to the opinion that they were taking the river water from the river flow. I was a witness in that case. My testimony is of record, Mr. Chapman, and I don't like to quote from memory. My recollection is that they had filtering galleries, so called, a lot of open-jointed pipes that they ran out there and that one-third of them ran under the river and two-thirds did not, and the majority of the water came from the part that run under the water in the river. I would under those circumstances form the opinion that the water they were taking was out of the river. I think at that time really one of the pipes of the Crystal springs went right under the river, I am not quite certain. I believe one went under one side of the river. We didn't make any measurement to determine whether or not there was less water flowing in the Los Angeles river at the point where these pipes were underneath. I was there and looked at it. I have answered, Mr. Chapman, that I didn't measure the water and consequently I couldn't testify whether there was any perceptible diminution of the water either from what was flowing immediately above those pipes and immediately below, or at the place where they were. I am certain that I wouldn't have stated at that time or at any other time that it made a difference unles- I had measured it, which I didn't do.

The COURT: Wait a moment; I don't think that is proper cross-examination to the extent to which you are going.

Mr. CHAPMAN: If your honor please, I think it is proper cross-examination to show upon what foundation this witness' testimony rests, that the taking of water by these underground excava-
830 tions will diminish the flow of the Los Angeles river. Now, I say that I ask him, of course, and I think I am not mistaken in saying that he testified then that it was not appreciable and that he testified then just as he does now that he didn't measure it.

Witness resumes: I have no doubt I testified that, Mr. Chapman, because I know I didn't measure it. I don't remember now of being asked as to whether there was a greater quantity of water flowing in the river a quarter of a mile, or some distance below where these pipes swept the river edge, than there was at that point or above it. You and Mr. White asked me a good many questions bearing on that subject and I wouldn't wonder that you did ask it. But I couldn't testify to it now I have no recollection. We did not measure the water above and below where the Crystal Springs pipes were taken out in the Los Angeles river. We could not have determined at once with absolute certainty whether there was a greater or less quantity of water below where these pipes were than above it, if we had taken the trouble to measure it. It may require a series of

careful measurements. The city doesn't always give us all the money we want to make the investigations; everything counts; we made all the investigations that we had the time and means to make.

Q. That still don't answer my question. You could have determined it, couldn't you?

Mr. DUNN: That is incompetent, irrelevant and immaterial.
The COURT: Objection sustained.
Mr. CHAPMAN: Exception.

Witness resumes: If the excavations were made in the Pomeroy and Hooker tract, on the north side of the river, I think the effect would be to cut off these underground streams, the channels, and thereby diminish the quantity of water flowing in the river. All you took in that tunnel would
831 affect the surface flow of the river, because the water comes up from below into the river. The general sweep of the inclination along the Pomeroy and Hooker tract on the north side of the land, I think, is 35 feet to the mile, in a northwesterly direction. Going the other way the tendency would be down and a little east of south. I was at both of the Pomeroy and Hooker excavations, and looked them over pretty well. I didn't measure the water flowing in those excavations, because I didn't want that information for the purpose I was making the other measurements. I didn't form any opinion about it. The water I think increased as we came down the bottom. I think the increase was gradual, yes, that is to say, it is less at the top than it is at the bottom. I would call the water that runs in an underground channel a stream, and I would call the channel the means by which that stream got out, the conduit, so to speak, the natural conduit. All I meant to convey as to what was in my mind when I was speaking of cutting off these underground streams by the excavations to the north of the river on the Pomeroy and Hooker tract was this: I don't consider that that water comes down in one continuous sheet; consider that it comes down in a series of streams, some more and some less. The word "percolates" has been so discussed that I would really like to know what you mean before I would understand the question as to whether I think that the water permeates the soil all through and percolates its way through the interstices of the material through which it flows. I took the trouble to look at Webster's Dictionary, and it refers you to filtration and back from filtration to percolation, so I was rather at sea about it. It is not Webster's Dictionary use of the word, but I want to know what you mean by it when you ask the question. My understanding of an underground stream does not differ very
832 much from yours, namely, that it is nearly the same as a stream on top of the ground; that is, a water-course, with the exception that the channel of it has material in it which has been brought into it by previous floods, gravel or something of the kind. They might have sunk a good many places and didn't find water that I didn't know anything about. The wells where they didn't

find water are not of record. My recollection is that I testified in the Crystal Springs Land & Water case as follows:

"By Mr. McFARLAND:

Q. Well, from the examination of the map and the premises showing those two 24-inch pipes located as shown on that map and under the river are you able to state where the water comes from which is found in these pipes?

A. Well, in my opinion, it comes mostly from the river, and I would give my reasons. The amount of water that comes along within 1,200 feet of the end of this pipe is about 9 feet per second. From that down, which is the largest portion, it only increases a foot and a half, which would tend to indicate that the larger amount of water comes from this upper portion that runs down the river."

I still hold that opinion.

Q. I will ask you if you did not, on the same occasion, testify as follows:

"By Mr. McFARLAND:

Q. Have you had occasion in these researches to examine into the question of percolating waters and underground flow?

A. Constantly, yes, sir.

Q. Have you made any personal examination of the bed of the Los Angeles river in the neighborhood of the Crystal springs?

A. I did.

Q. How much of an examination did you make up there?

A. I think I was there altogether on four different occasions.

Q. Did you hear the testimony of Mr. Bassell this morning in regard to the locations of the wells?

A. I did, yes, sir.

Q. Did you hear the testimony of Mr. Bassell in regard to the locations of these pipes and flumes?

833 A. I did, yes, sir.

Q. Did you hear his testimony in regard to an opening in the bulkhead?

A. I did.

Q. And also his testimony in regard to the opening in the flumes where it crosses the Crystal Springs pipe.

A. Yes, sir."

Then you were asked to point to the jury on that place on the map and explain the character of it, which you did.

Mr. DUNN: Well, we will admit that's true.

The WITNESS: Yes, sir—are you asking me if I——?

By Mr. CHAPMAN:

Q. No, I just give you that now to give you an understanding of what you were testifying about subsequently. Now, after that preliminary examination you were asked:

"Q. What is the character of the formation of the soil below it around the spring?

A. The soil below it seems to be what you might call river bottom, and what was made by the river.

Q. You mean the sands?

A. Yes.

Q. Well, how is that soil—capable of absorbing or carrying water by percolation?

A. O, yes, sir; that soil would absorb probably 20 per cent. of its bulk, possibly 30 per cent., under certain circumstances of water." Do you remember of so testifying?

Mr. SCOTT: Same objection as last.

(Objection withdrawn.)

The COURT (after argument): You may answer.

Witness resumes: As far as you read there, yes, I think I testified to the effect that the water—about the absorption of the water there and everything. About 30 per cent. void, yes, that would be filled up by absorption. I presume that's what I would say. And I thought the water in those pipes came from the river because the quantity was so very much greater for the first few hundred feet from the river than the gain between there and the lower point at which the measurement was made. That would indicate that it came from—
834 that portion of the —. In similar soil, where an excavation is made and the increase is gradual all along the line, if the increase was perfectly uniform, I would say that the cause of that water coming in was the same; but I didn't say that such a state of thing could exist. I saw a good many of the wells that were bored on the Pomeroy and Hooker tract by the defendants in this action. I saw those that were bored by the city or under its direction; I drove out to them. When the data that was discovered by the boring of those wells was brought into the city engineer's office, I looked into it. We made some calculations about the velocity of the water flowing beneath the soil, and we found that without underground streams to carry that water, that the velocity would be inappreciable; that is to say, if it ran through it as a body, without underground streams to give increased velocity to—so that I have not made up my mind what that velocity is, in —. There is one thing that would seem to indicate it, and that is the amount of increase in the eleven acres of the river. The amount of increase there would seem to show that the velocity there, of about half a foot an hour, say. There were no reports made to the city engineer's office that bear on your question, as far as I understand it, Mr. Chapman. You asked me—I didn't make any tests for the purpose of determining the velocity of the water through the soil. We had no—there is no data that enables you to figure that with any degree— The only thing that we had bearing on it was a report that we had from Mr. Schuyler—I forget which—and that would seem to indicate that it would take about sixty years for that water to go across there, unless there were underground streams to bring it. I couldn't find any data that were sufficient to make any calculation to which I could testify in this court, as to the velocity of

the water under ground. I made no tests to ascertain
835 the velocity of the water on the ground. Such tests wouldn't prove anything at all. If those with whom I was acting made any tests, they were not made when they were with me. I was not out there when the dyes or paints were put in the wells on Pomeroy and Hooker's land, at any point near the cut. No report has been made to me that I know of. I said the ordinary summer flow of the Los Angeles river was according to my computation, about 2,500 inches, I believe—the surface flow, at the eastern end of the Pomeroy and Hooker land. Mr. Eaton has testified that at this cross-section it was nearly 4,000. From what testimony I heard here, I should say that includes the water that is sup-osed to have been diverted by the underground developments of the Crystal Springs Land & Water Company. There are local peculiarities that exist everywhere, that will affect the rainfall, and it is a fact that in every district of any considerable area, mountains and valleys, that there are points that will be found where the rainfall is less than it is at others within a very short distance, a few miles. In this valley, in this Los Angeles country, between here and Riverside, there are local peculiarities that will affect it to a small extent. There are two things we may do, Mr. Chapman; one is to make a series of investigations over a number of years. And those, for that peculiar locality, will give us a very accurate result. In the absence from this we can only interpolate from similar regions—make our calculations accordingly. If those observations and calculations have extended over a number of different districts with practically uniform result of a certain percentage of increase according to elevation, then it would be fair to assume that the same condition of things would be found elsewhere in the same country; in the absence of any better information I should use that. In applying Mr.
Lippincott's rule, and in taking the Van Nuys station and
836 the San Fernando valley at an elevation of 770 feet, I was looking for the lowest recorded rainfall. I did have an idea that that would give me a fair result for the average rainfall of the watershed. I had looked into that law of Mr. Lippincott's before this suit occurred at all and I have satisfied myself, with comparing the rainfall of the coast at San Diego and of the different reservoirs inland, and rainfall at Santa Monica and Bear valley, that such a law is a very fair law to go on for the rain—drainage area that faces the wet southeast wind; but that when you leave that why, it's a question with me whether that would exactly hold or not. I haven't had an opportunity to investigate it with reference to rainsheds in the interior, so that I couldn't say; but on this valley right here from San Diego up it is very near the truth. I was present when Mr. Lippincott testified; he took the Los Angeles rainfall and applied his rule to that. I took an elevation of 770 feet and the lowest rainfall, because I had in my mind a physical obstacle there that made Mr. Lippincott's method of applying his rule, in my mind, erroneous. There is an intervening bench of hills there that takes a portion of the precipitation. That is the Cahuenga range, and until that is accounted for, why, you are

not at liberty to take it. If that didn't exist, why, then I would take Los Angeles. I didn't know that she showed that just exactly such features did exist in every place where these experiments had been made; that led to the deduction of this rule. There is no doubt that local conditions would govern to a certain extent the increase; and all you can do is, take the best approximation that you can get. I didn't notice Mr. Lippincott's testifying, that in these districts where observations had been made, just such conditions as exist here in the San Fernando valley, do exist in all of them; that from local causes at particular places the rainfall will average below
837 what it should be according to that rule. I investigated this rule before he was on the stand at all, looked into the data by which he got his rule, and I satisfied myself that it was a fair approximation for the conditions of things on this —. Well, I don't remember finding any place that would contradict his rule, although presume that if you went over into the desert on the other side, the dry side of the range, you might find that it wouldn't hold. We know one thing, that there are all over the world mountain ranges that take the rainfall on one side, and then when the rain current passes over onto the other, why, the precipitation is not in proportion to the elevation. In some places there is no precipitation at all; like Peru. I say, this isn't a desert rule. I have used it for the case here as it is. And took the place of the lowest rainfall, because I wanted to see—to form my own opinion as to the greatest amount that that river could carry, above and below. And, having made up my mind that the normal summer flow was a governing factor, why, I thought I would go down to as low a rainfall as I could find, so as to find what that would be. I think I have not made any attempt to compute the amount of flood water that would be discharged by the Los Angeles river in the year of the greatest rainfall that I have taken. I have no recollection of it. I didn't do that because to my mind it was immaterial; all that would be waste. If I should find that the Los Angeles river in such an event was required to carry off ten times more water than any human being ever saw it carry, that would be a purely hypothetical case. If I found that the Los Angeles river would carry off ten times as much in the winter as any human being ever saw it carry off, why, I would say that was a very phenomenal flood.

(To the COURT:)

838 I have no data that proves that if my theory is correct, then the amount of water which fell in the year 1884 could not have been carried off by the Los Angeles river.

(To Mr. CHAPMAN:)

I had the data from which I could make the calculation; I have no doubt the calculation would show me here that the capacity of the Los Angeles river to carry off that water was ample; if it was made. I have no reason to think to the contrary. I could very easily have verified that by making the calculation, if I had known you wanted it. I think the floods from that river, as to quantity,

are largely exaggerated, all the same. As I understand, the city proposes to run a main tunnel upon these lands, and to run open-jointed laterals from that to take the water in. I think it enters at about three feet and goes up to about 32, is my recollection of it. I know where the laterals are. I think that with such works as that you can take down all the river into the tunnel, if you want to. Those works so far as they go, will take a certain amount; and that amount will diminish the flow of the river. I haven't figured on the amount those works will take. I suppose they have been figured to take the amount necessary for the present population, with the opportunities to increase for the future. No other plan would be intelligible. I have not made any calculation as to the extent that a tunnel 33 feet in depth would affect the water plane on each side of it, because I don't think that it's possible to do so without an actual experiment. Those things vary very much. There are several analytical rules to calculate them; the actual test is the most satisfactory undoubtedly. Those cuts that would be put in there would supply some data; some information might be obtained on that subject. In arriving at my estimate of the quantity of water that is furnished by the Verdugo, I believe I figured up the number of square miles and took a—the rainfall, multiplied that—calculated it that way. I was trying to think what I took for
839 the rainfall. I didn't make any very close calculations on that, because it didn't touch the questions on the Pomeroy and Hooker—the rainfall of an average year in the—would be in proportion to the elevation; multiply it by six-tenths. There would be about 25 or 26 inches I suppose, average. (Witness refers to Plaintiff's Exhibit 13.) The elevation would be nearly 3,000 feet from Los Angeles, according to that map. I would take Los Angeles for the basis here. That's a different proposition, you know, from here. (Witness indicates upon map.) The elevation here is 3,184; this would be above the sea; Los Angeles is about 250 to 300 feet above the sea. That would leave us about 2,900 feet. The average rainfall in Los Angeles is 17.44.

(To Mr. DUNN:)

There is another item in that same shed of 40 miles; there are foot-hills all around it. I testified that that goes into this 150 inches. That would be 34 inches for an average. It is not the very best place to figure on the witness stand; a man wants to figure on important matters in his own office. In figuring on the outflow of the river from this Pomeroy and Hooker land, which is in issue in this case, I threw out the Verdugo watershed, because it isn't tributary to it. It must find its way into this celebrated "narrows," and the formation of the country shows it. But I haven't testified as to the amount of water in these "narrows." The 4,000 inches on the surface there is an exact measure of what flows on the top; there is some more flowing below—if it is 4,000. But mind you I haven't testified it was——. Well, I say that if the surface flow of that is 4,000 inches that is somewhat of a measure of the water flowing through those narrows; because it shows what is forced to

the surface. But how much there is flowing there that is not forced to the surface, I do not undertake to say. And therefore I didn't consider it important to figure upon the amount of waters on the Verdugo shed—I figure it on the
840 amount of water that is at the lower end of the Hooker and Pomeroy land; and I figured also on the fact, that, in my opinion, any water diverted from that land and carried away to some other place, would be missed from the river below. I arrive at that conclusion from a common-sense principle that you cannot take anything from the bottom of a cistern without affecting the water on top. You can't take one atom or particle from the universe without affecting the bulk of the universe. If you take an amount of water off of any particular shed and bring it onto another shed, you diminish the water that was on that first shed. You diminish the whole amount that can be drawn from there. I don't consider the surface flow and underflow as differing. I consider in this question they are intimately connected; they are one and the same thing. I have been giving my whole testimony upon the assumption that they are one. On this particular river I say that the underflow and overflow are intimately connected as far as I can see.

Q. Then did you mean that the 4,000 inches of water that you think furnishes this constant surface flow includes also the percolating waters beneath the surface?

Mr. DUNN: That is objected to on the ground that it assumes that there are percolating waters, and that has not been proven.

The COURT: It only asks the witness the question.

(Discussion).

Witness resumes: Well, as I understood Mr. Eaton here when he testified on that, he summed up the amount of water flowing on the surface at about 3,900 and something, practically 4,000; perhaps I misunderstood him, but that is what I understood him to say. That is what he found on the surface. I haven't said anything about the constant flow of 4,000 inches—haven't said a word; I
841 say the flow of the river—the summer flow of the river—well, I meant—yes; what I meant is that the top flow of the river, as seen and measured, in the summer, is what I allude to as the constant quantity. I don't know what it is down there; I know what it is where I measured it up above, at the lower end of the Pomeroy and Hooker place; and there it was 2,500 inches, adding in the main supply ditch. And I heard testified here, that adding in what is taken out, from the river below the Pomeroy and Hooker tract, plus the amount flowing at this cross-section, makes about 4,000. I don't undertake to say anything about the quantity of this underflow, that may be passing below this section. I maintain that to measure the underflow and overflow with mathematical accuracy down to 100 or 150 or 170 inches, is not possible, in my judgment. And I therefore based my intentions and figures on endeavoring to find out what it couldn't exceed; because, if it couldn't be greater than a certain quantity, why, then we would gain that much, any-

how. In determining that quantity of water than which there couldn't be a greater quantity, I will say that the Verdugo watershed wouldn't be of the slightest consequence, if you measured that river at any one particular point, over a series of years, and found that flow was constant—that would be a very fair indication of the summer flow, of what is flowing on the surface. The mere measurement of the surface flow wouldn't be the slightest indication but what there might be a sure-enough underground water-course there that was carrying off 25,000 inches; certainly not. But it would be an indication that that surface flow was being the excess of the whole, so to speak; the excess of what is below; what is brought to the surface; that it was an indication that source of supply was constant, for both, because the surface water is held up by the water below; and the water comes to the surface from below, as you can see through that river
842 yourself, Mr. Chapman. You see it bubbling up. According to the Newell curve, up to 12 inches of rainfall on undulating plants, there wouldn't be any run-off. In this undulating plains the plant life takes it up, and uses that amount. We also find out from irrigation works that it is the same thing. I threw out the undulating plain on that account, because I say with a low rainfall, it would yield no water. I say this Newell curve here shows that, up to a certain number of inches, there is no run-off—up to 12 inches, it is taken up by natural causes. I said two or three times it is taken up in evaporation and plant life; that is good enough; I don't know any other thing that can take it up. My proposition is that undulating plain—that, up to a certain amount, the water precipitated on it is used up in plant life and evaporation, and that amount is about 12 inches. And for that reason, I take no note of the rainfall on the San Fernando plain in my computation for the purpose of ascertaining what is the amount of water that flows in the Los Angeles river, and flows under the lands in this section of the country. I don't think that undulating plain supplies any. If the 12 inches of rain that falls upon this undulating plain and supports the plant life didn't fall there, the plant life would either perish or it would have to be supplied with water from some other source. I reject the amount of water which falls upon this plain because it is a cultivated plain, used for agricultural purposes, and the history of those things shows that very fact. The water which falls on a mountain shed runs off very much quicker because the plane of those hills is very much steeper. It is not consumed in the valleys by supporting plant life, if the plant life is supported by the water which falls on the surface. That water that comes down out of the whole shed is absorbed by the gravelly streams—those gravel beds, and given off into the river. About 40 per cent. of that will be absorbed
843 into those streams, and about 60 per cent. will be used up, either by plant life or evaporation, or something else. Either by one or the other or both. I presume there is sage brush on the sides of those hills around that San Fernando valley. I have been up that Pocoima there, several years ago, and I have been over

parts of those hills. Oh, there is the usual things which you find on those hills. I wouldn't like to say that is nothing. But even if you did figure in that San Fernando valley, it wouldn't give you a very great amount more on a minimum year; although I shouldn't do it. I would have done it if I had thought it advisable. My percentage for absorption is based on the information derived over 30 years of experiments by Mr. Laws, Dr. Gilber, Dr. Dickinson, Mr. Evans; and it ranges from 34 per cent. to 44. Now, I take an average, and called it 40 per cent., for the purpose of this calculation. Those gentlemen used all kinds of material, and they found the average absorption ranges from 36 to 44 per cent. Not absorption and evaporation; absorption I am talking about now. I didn't go into the average evaporation; the average loss after that would range from 56 to 64 per cent. The average of evaporation and consumption in support of plant life would range from 56 to 64 per cent.—what wasn't used for absorption. I never did make any actual measurements of the amount of water in the Verdugo canyon or in the Tejunga canyon; nor in the Pocoima. I was up there one time when Mr. Widney was putting down that dam of his, and I saw the stream that was coming out, but I didn't measure it. That is the Pocoima I am talking about now. I have seen measurements made in the Tejunga; but I am not sufficiently satisfied with them to state them. The measurements were made about 3 miles up; I couldn't tell who made the measurements; the weir was there; I presume the measurement was made by some engineer. I said I had seen measurements
844 that had been made there. I have had the statement of the amount. I didn't see the measurements made; I don't know anything of them myself. I was not satisfied with them, because on afterwards talking it over with other parties, I found they cut it down about nearly 30 per cent. of their amount; and I found the evidence was conflicting; I say, that on talking over with other parties who knew that Tejunga watershed, and who had made measurements there in previous years, they gave the amount at very much less, and I concluded the evidence was conflicting, and so I wasn't satisfied with the first measurements, because it was too much. I believe the amount reported there was somewhere about 1,000 inches, three miles up the canyon. Afterwards I heard that some previous years that had been as low as 400. So I felt that couldn't be taken as a minimum. I just made an estimate on the rainfall in the Verdugo watershed for you. I made a minimum estimate over the Tejunga range-shed of 11.56 in a minimum year. I believe I have figured up that average; I believe I made it somewhere about—I didn't make it up for Mr. Dunn, so he couldn't be supposed to know it. I said I had made the measurement myself in the Pocoima creek. I never made any measurements in either the Pocoima, or Big Tejunga or Little Tejunga, nor in the Verdugo. I think the average rainfall in the Tejunga watershed, as I estimated it, was about 21 inches. I think the rainfall should be less there than in the Verdugo because the height—the elevation is less, in the first place, is one good reason; the average elevation; it is testi-

fied to here by Mr. Lippincott, it averages 2,700 feet. Over that whole mountain shed. I took Mr. Lippincott's figures because they were satisfactory. I didn't take his basis, though, of Los Angeles, to calculate from, on account of the Cahuenga range. Mr. Lippincott took the 2,700 feet of which I am speaking, as the average elevation of the whole tract above the sea level. That map states that the elevation of the Tejunga alone is greater than in the Verdugo alone. I take Lippincott's computation of the average, to fix the Tejunga, and I take the map to fix the elevation of the Verdugo, I see your point. You asked me right here to figure at that, and I went up and took that there. I could take the Lippincott general average, and if you want to throw the Tejunga into the general average, why, it would reduce the rainfall. But having the actual figures there, when you asked me I went up, and looked at them and told you. I think the actual figures show that the Tejunga is less, Mr. Chapman; let's look (witness examines diagram). Well, of course there are elevations up here of 1,556, and here the lowest part of the Verdugo is 3,184; and the lowest part of the Tejunga is 1,556. The highest part here isn't given; but there is a mountain, Mount Gleason, which is an exceptionally high peak, 6,493. That would give the general average.

Redirect examination.

By Mr. DUNN:

I didn't figure the Verdugo watershed, only just what is there, you know, for Mr. Chapman. As a matter of fact, in figuring the amount of inches in that shed, I took Mr. Eaton's statement, based most of my idea on it, that in a general way, there was 750 inches. As I testified here I have confined my investigations to the Pomeroy and Hooker land; and I have not attempted to figure the Verdugo watershed accurately. I can figure it, if you want to. In figuring the total amount of the normal summer flow of this stream I figured it at 5,200 inches. That included everything that would pass through the lower end of the Pomeroy and Hooker land as sought to be condemned by the city, if it was not obstructed at any time or diverted—the underground flow as well as the surface flow. I want that understood, Mr. Dunn, that I don't state that 5,200 inches is the amount; but I say that it cannot exceed that amount. It is the limit. That the water which passes under the ground and on the surface, through that valley at the point where Pomeroy and Hooker's land is, and opposite that, cannot exceed 5,200 inches. The Verdugo watershed enters the Los Angeles river just at the Crystal springs—it comes in right opposite where the Crystal Springs water pipes run under the river. And it brings into the river a considerable amount of water. Supposing the Crystal Springs Water Company, or the Los Angeles City Water Company, were diverting 300 or 400 inches by means of their underground pipes at this particular point, that would probably not be noticeable upon the surface, taking into consideration the fact that the Verdugo came in at that point, as the increase would be larger than the outgo.

Recross-examination.

By Mr. CHAPMAN:

I don't know how much water flows into the Los Angeles river from the Verdugo on the surface of the ground. Let me see; I don't remember, really, however, that I know of any. At the normal condition of the river I shouldn't think there is any water flowing in at the surface from the Verdugo, but I don't know. I haven't been there to investigate it. They testified there is 750 inches—I don't know about that; what comes in on the surface. I don't know whether there is any or whether it all sinks before it arrives at the river and comes up in the bed, in either the one or the other. When I say the Verdugo supply-s a considerable quantity of water to the river at that point, I am not just assuming that it gets in the soil there, and comes down, and comes up into the river. I have
847 been up that Verdugo canyon. I know several very good streams there. I know there is considerable water there, and that it all heads that way. All roads lead to Rome, as the old ancients used to say; and it must get to the river. It may come under ground or it may come partly over ground or both; or may come all under ground. I am not prepared now to testify on that, because I have no recollection. Of my knowledge I don't know. That is all I can say.

JAMES D. SCHUYLER, called for plaintiff, sworn, and testified substantially as follows:

By Mr. DUNN:

My profession is civil engineer. I have followed that profession since the year 1869. I have resided in California since the year 1873 and practiced the profession during most of that time; all but about an interval of two or three years. I was chief assistant State engineer, in charge of the irrigation investigation for several years; three or four years. In the course of my work I measured all of the streams of the San Joaquin valley that are used for irrigation, and nearly all of the streams of southern California. I placed gauge rods in 21 or 20 streams of the San Joaquin valley, and took gaugings of the stream, and arranged with recorders to keep daily records of the heights of water on those gauge rods. And from them, computed the volume of water flowing at different stages of the streams. Made a rating curve of each stream and these measurements were kept up for a period of six years; beginning in the season of 1878 and '9, and closing in the season of '83 and '4. Those computations were carefully made and compiled, partially under my direction and published in, I think the year 1886, in a volume "Coast Physical Data and Statistics," by the State printing office. I constructed the Sweetwater dam down in San Diego. At that time I took data of the run-off rainfall, and so on, in that locality.
848 I established the rain gauge at the dam as soon as we began work there, and it has been maintained ever since, and the measurement of the flow of the stream has been accurately kept up.

It has been very easy to measure, because it was mostly caught by the reservoir. The dam was on bed rock and all water was caught. Whatever water overflowed was always observed and carefully measured. So that a correct computation could be made as to the total yield of the watershed. I am familiar with the Los Angeles river and the source of supply of that river. In the year 1880 I made a reconnois-ance over the entire watershed of the Los Angeles river, with a view, of ascertaining the possibility of construction of storage reservoirs. And in the course of that reconnois-ance, visited every important stream and went up it, on horseback or on foot, almost the entire length of it. I took measurements of the Los Angeles river at that time. I measured the river at a point at the head of what was then the head of the main supply ditch, at an old pile dam which was supposed to be on the line of the Providencia rancho.

Mr. DUNN: Unless these gentlemen will admit that point is on the eastern boundary, or very close to it, of this land——

The COURT: That is the old pile dam you are talking about?

Mr. DUNN: Yes, sir.

The COURT: It is just below the east line.

Mr. DUNN: I think I have qualified Mr. Schuyler now, pretty thoroughly, and I will withdraw him. They wish to recall Mr. Purcell now.

GERVAISE PURCELL, recalled for further examination testified substantially as follows:

By Mr. CHAPMAN:

I was employed some time ago by the directors of the La
849 Sierra Water Company to make investigation of the sources of supply for a scheme for bringing in the waters into the city of Los Angeles. That was about six years ago, I think. My transactions with that company were strictly private. I made a report to the company. I do not know that it was circulated all over the country; and I have never known, and I don't believe now, that it is—I know how it is in your hands, Mr. Chapman.

By Mr. CHAPMAN:

Q. Did you in that report state as follows——

Mr. DUNN: Now may it please the court, I will object to the question.

The COURT: Well, wait until he gets it out, Mr. Dunn. I can't very well rule on it in advance.

Mr. DUNN: Well, I don't want counsel to get a lot of stuff before the jury here. I never heard of this Sierra Water Company and——

The COURT: Well, wait until you hear the question. You may not object after you hear it. Certainly I can't tell whether your objection ought to be overruled or not, until I hear the question.

Mr. CHAPMAN: We are not trying to influence the jury, and, if your honor wants to read it before I do——

The COURT: No. Finish your question.

By Mr. CHAPMAN:

Q. "Rainfall. Government statistics show the average rainfall of Los Angeles county to be 17.44 inches; and a personal residence of ten years confirms that. All of this rain falls during five of the winter months, and it is your intention to conduct off these waters during these five months, and retain enough by deep reservoir storage to maintain the necessary supply to fill the city's demand, both now and in future, with a large reserve left over. 1878–9, 11.35 inches; 1879–80, 20.24 inches; 1880–1, 13.13 inches; 1881–2, 10.40 inches; 1882–3, 12.11; 1883–4, 38.22; 1884–5, 9.25; 1885–6, 22.58; 1886–7,
13.76 inches; 1887–8, 14.01; 1888–9, 19.25 inches; 1889–90,
850 33.84. Average for twelve years, 17.44 inches. A rainfall of 17.44 inches as computed by the Government observation does not truly represent the rainfall over this watershed, the observation being taken on the plane of Los Angeles city. The watershed, owing to its topographical position, facing as it does, the wet trade-winds blowing from the Pacific ocean, and from its elevation, from 1,700 to 5,600 feet above the sea, it condenses the rain-clouds earlier, and also later in the season than the valley. By comparison of rain-gauge record kept nearer the mountains, the best observations indicate an increased fall of over 70 per cent. of that of the valley record. That makes 30 inches of rain in these mountains for an average. An inch of rain will give 2,323,200 cubic feet per square mile; and, equating, we find quantity of average rainfall of the entire watershed equals 2,323,200, multiplied by 100, multiplied by 30, equals 6,969,600,000 cubic feet; or, in round numbers, 52¼ billion gallons average rainfall in five months, making due allowance for evaporation, absorption, and percolation, you may calculate on having available for storage 26,000,000,000 gallons of water per annum."

By Mr. CHAPMAN:

Q. Did you so report?

Mr. DUNN: Objected to, on the ground it is incompetent, irrelevant and immaterial.

The COURT: I think unless you show the La Sierra Water Company was going to take water or that report was made on the section of country somewhere around——

Mr. CHAPMAN: The Arroyo Seco, up opposite Pasadena.

The COURT: That makes it immaterial, I think. I think Mr. Purcell has testified that if this watershed of the San Fernando was located on this side of the mountains, his figures and estimates, and
everything else, would be entirely different. And, as I un-
851 derstand the testimony, the Arroyo Seco is on this side of the mountains. So that there is no contradiction, or standard of comparison.

Mr. VARIEL: We claim that is a privilege we have a right to argue to the jury.

The COURT: I have to determine something about the admissibility and relative importance, and so forth, of testimony.

Mr. VARIEL: We except to your honor's stating to the jury what has been proven in evidence or what has been established in evidence.

The COURT: Well, if you want to, I will take judicial notice that the Arroyo Seco is on this side of that watershed. It is a physical fact, that no jury or court or anything else can change.

Mr. VARIEL: We note an exception to your honor making the statement.

The COURT: Well, you can note the exception. I hope the gentleman don't propose to prove that the Arroyo Seco is on the other side of the Sierra Nevadas.

Mr. VARIEL: Not in the same watershed.

Mr. DUNN: I think the gentlemen fully accomplished what they intended to do, when they got it in.

Mr. VARIEL: We propose to show these facts and ask this witness if he sees any reason to change his view; and ask this witness to further state to this jury, if he can, any reason why the rainfall upon the shed of the Verdugo or the Tejunga or Little Tejunga, or the Pocoima, should be any less than it is in the immediate vicinity on the head of the Arroyo Seco. That is the proposition which we present and propose to present.

The COURT: Well, you are simply raising an issue, for the purpose of having the witness explain it when you get it down.

Mr. VARIEL: We are dealing in approximations in these things, for the want of accurate knowledge of what exists on the watershed.

852 Mr. DUNN: I am very strongly tempted to go ahead with the whole thing, your honor. I only do this on account of time.

The COURT: The only approximation that the witness has made is to state that he estimates, from the lowest rainfall in the San Fernando valley, that a certain amount in addition would fall on the watershed of the Tejunga, the Pocoima, and the Little Tejunga. All other approximations were brought out on cross-examinations. And I don't think it is proper for you to bring out an approximation on cross-examination, and then bring out another one and contradict it. I will sustain the objection.

Mr. CHAPMAN: We except.

Mr. VARIEL: We don't propose to contradict him. We want the witness himself to explain his theory. It is a part of the explanation in cross-examination of the theory which he has built up here before the jury.

The COURT: He hasn't put forward any theory on the examination-in-chief that will illustrate anything about.

Mr. VARIEL: Well, we are dealing at present, your honor, with the theory of the witness upon the stand.

The COURT: Well, it is a theory you brought out yourself, and you are bound by it, I presume, if you have brought out any theory this has any bearing upon.

Mr. VARIEL: Our theory is there isn't any difference between the watershed of the Tejunga and the other streams, and the watershed

of the Arroyo Seco and the other streams east. Our theory is the saturated winds of the Pacific ocean reach all those mountains; and the little exception of the San Fernando valley is not to be made the basis on which the rule is to be formulated.

The COURT: The witness states it is his theory that the rainfall on this side of the mountains is different; and your proving
853 that he said so once before won't make any difference in his testimony, or tend to impeach him.

Mr. CHAPMAN: Well, for the purpose of having one of the propositions contained in this also in the record, I would like to ask the witness another question upon the report, omitting all that portion of it about the rainfall.

The COURT: Proceed and ask any other question.

By Mr. CHAPMAN:

Q. Mr. Purcell, did you not report, after stating the amount of rainfall——

A. One moment, Mr. Chapman, if you please. Your honor, this was a confidential report made by me to a private company. While I have no objection to answering the questions in relation to it, I feel it is a breach of confidence.

The COURT: That may be; but our laws concerning privileged communications do not extend to communications made by engineers to their clients, like it does to attorneys.

The WITNESS: All right, sir. I only raised the point as a duty to my clients, that is all.

By Mr. CHAPMAN:

Q. "An inch of rain will give 2,323,200 cubic feet per square mile, and, equating, we find quantity of average rainfall of the entire watershed equals 2,323,200, multiplied by 100, multiplied by 30, equals 6,969,600,000 cubic feet; or, in round numbers 52¼ billion gallons average rainfall in five months; making due allowance for evaporation, absorption and percolation, you may calculate on having available for storage, 26,000,000,000 gallons of water per annum." Did you so report?

A. Yes, I so reported.

A. H. KOEBIG, called for plaintiff, sworn, and testified substantially as follows:

By Mr. DUNN:

My profession is civil engineer. I graduated in '76, and ever since I practiced the profession. I graduated in Germany. I
854 have practiced in southern California since 1884. My practice as a civil engineer, since 1888, has led me continuously into investigations of rainfall, watersheds and storage of water. I have investigated and examined particularly the watersheds tributary to the Arrowhead reservoir system, which is a part of the Mojave river; and also the watersheds tributary to the entire Mojave

valley, to Lytle creek, the Santa Ana river, and the Bear creek. I was at one time the consulting engineer of the Bear Valley Water Company. I have investigated the watershed which furnishes the source of supply of the Los Angeles river, for the purpose of this suit; I have been in the employ of the city to make this investigation, since January. I know the number of square miles of watershed tributary to this river, by the testimony given here in this suit, and also by the records in the State engineer's report. I have adopted Mr. Lippincott's figures for the number of square miles, which gives the valley shed 182 square miles; the foot-hill shed 127 square miles and the mountain shed 179 square miles. I have not investigated regarding the rainfall in this watershed any further than taking Mr. Lippincott's and ther witnesses' testimony here on the stand, and comparing it with such watersheds as I have investigated myself. I have seen and examined the Government statistics. For the average rainfall over this watershed I accept, for the valley shed, 15 inches; for the foot-hill shed, 19.2 inches, and for the mountain shed, 27 inches. From that, knowing the number of square miles in the watershed and the amount of water falling on the different areas, I have figured on the number of inches, miners' measurement, that will supply evaporation and plant life, and the number of inches which will supply run-off. In order to get the yield of this watershed at a given rainfall, I divided it into three classes; first, the loss by plant life and evaporation. In
855 the valley shed I figure the loss of plant life 14 inches for that given rainfall; plant life and evaporation. The foot-hill shed, I figured the loss and evaporation 13 inches. And at the mountain shed I deducted for loss evaporation and plant life, 12 inches. The reasons for doing so are various ones. First, my experience in measuring the Arrowhead watershed, for a number of years in succession, showed me that on a mountain shed is always lost about from 12 to 15 inches; entirely lost; which water can't be traced in the measurement back in any shape or manner. And this loss increases as the watershed gets more level, less rocky and more porous. Then the records given in the Geological Survey seem to uphold that figure, which I have gotten by experience pretty well. And it is known also to me by observation that it takes at least 12 inches of rainfall in a valley to make a good crop of grain of any kind. Furthermore, it takes at least 12 inches of water to cover an acre of land; 12 inches with water in depth to irrigate, during the summer, orchards. The valley or plain such as exists from here to San Bernardino, and San Gabriel, and the valley above it, is mostly a fruit-raising as well as a general agricultural country. The rainfall on that valley is varying; I should judge that the average rainfall would be about 10 inches; that is, the rain which falls during the winter. A proper supply for irrigation besides this rainfall, as I state, for orchards and so forth, the least amount is 12 inches in depth over that. That would give one miners' inch to 8 acres. And for alfalfa, an inch to three acres would increase that 12 inches to about 20 inches in depth. The irrigation season is estimated at 200 days per year. A miners' inch of water

to 8 acres will amount to 12 inches of rainfall. Then I deduct that from the amount of the rainfall, which I have given before, and have left only the water which would seep
856 into the ground beyond the reach of the plant life and evaporation, and the water which runs off during the storm time; storm seasons; rain and floods. Now, the percentage of water running from any watershed during storm depends on the character of the watershed; on the slope of the watershed; in short, the topography; and also on the way the rain falls; whether it falls in torrents, cloud-bursts or in gentle rain. And how much rain does fall; because, after the ground is once saturated, the percentage of run-off during the storm time increases very materially. My experience in measuring, again, over those different reservoir sites and reservoir propositions for years, has shown me that this proportion varies between ten per cent. of the water which is left for storm water up to 90, and perhaps in time of cloud-bursts, to more than 90. In figuring this watershed I assumed that 60 per cent. for the valley would run off—60 per cent. of the rainfall in the valley. San Fernando valley itself, would run off during the flood time; and 40 per cent. would give the yield which would seep into the ground beyond the influence of plant life and evaporation. That yield amounts to 253 miners' inches. That is what the valley furnishes to the normal flow of the river. For the foot-hill shed, with a rainfall, as I stated before, average rainfall, I have also allowed 60 per cent. of that rainfall to run off during the storm season in the flood waters of the river; and 900 miners' inches would be yielded towards the continuous flow, or supply of the continuous flow of the Los Angeles river. In the mountain shed I only took 30 per cent. of that amount of water left towards the yield, which would give me 4,100 miners' inches to supply the Los Angeles river. In total, 5,253 miners' inches. From my investigations and the information obtained from all the possible sources, it is my opinion that the figures I have just given represent the
857 normal flow of the Los Angeles river, under ground and on the surface, or about as near as such matters can be obtained. I couldn't figure that number of inches down to a quarter of any inch, and not to 500 inches. These figures give as the total, representing the normal flow of that river, under ground and surface, 5,253; 5,200, call it. At the east end of this land, I think I measured, in the surface flow of the Los Angeles river, 2,100 inches, or 2,400 inches. About 24 or 2,500 inches. That would leave flowing under ground through this valley at the upper cross-section, about 2,700 inches. I dropped the 53. 2,753 inches represent the underflow, in my opinion, that a cross-section across this valley opposite this land would show, at the normal summer flow. I have heard the testimony on both sides regarding the borings, and what those borings show. Assuming that 50 per cent. of that water runs under this land, which would be 1,350 inches, or thereabouts, and assuming that the cross-section is 123 feet deep, and the land a half a mile wide, the proportion of this water that could be taken out by a gravity system, in my opinion, depends upon how deep you go with

your works under the saturated plane. That is a very hard question to state, mathematically correct; and I don't think it can be figured out to any satisfaction. In this underground water system, 1,350 inches or 1,400 inches altogether, could not be taken out, without affecting the surface flow of the Los Angeles river. No material portion of it could be taken without affecting the surface flow of the Los Angeles river. I have examined the cross-section, a picture of which is shown on the map marked "Narrows of the Los Angeles river," also marked Plaintiff's Exhibit 26; I know the number of square feet on this cross-section; I think it is 197,000. 176,000 in the water plane. I have also heard the testimony regarding the material found in that cross-section. In an indirect way I have had experience in examining similar cross-sections with a view to determine the amount of under-
858 ground water discharged through them in a given time. I have seen underground developments and figured on the amount of cross-section they represent; and have measured the water coming from the same. I have an opinion as to how much water is discharged underground through that cross-section, constant flow. Applying this experience I had in it, I should say there wouldn't be less than 300 inches and not more than 800 inches, of subterranean waters, flowing through that cross-section. In my opinion, the surface flow of the Los Angeles river is caused by the rainfall on the entire watershed tributary to it, which, after all the losses are deducted, runs down the side hills and in the soil. It runs into the gravel bed of the San Fernando valley and through the more porous material which is lodged as deltas at the mouth of the canyons, in underground channels; which, like fingers on a hand, run towards the narrows or towards the place where it strikes the Cahuenga mountain. There it is gradually checked; not only by the narrowing up of the basin but also by the finer, siltier material deposited there to fill up the gravel bed; forming somewhat of a dam, but still leaking; a leaking dam. Now, in my opinion that water coming from those underground streams, being checked there, forms an underground body of water, like in a reservoir only mixed with the gravel, sand and boulders; and is retarded in its flow down to the narrows, as well—upwards; and raises upwards wherever the pressure is less than the weight and the resistance the gravel and sand on top offers; thusly forming the Los Angeles river. The surface stream is a part and portion of this underground water flow. The surface stream is flowing on top over this reservoir, like water flows over a vessel, an overflow. And it is very hard to separate that overflow from the body of the water in the vessel itself. If you were to go under the ground and relieve the ground of its moisture
859 under the river, then the plane of the water, the level of the water will lower itself. Undoubtedly the water beneath supports the water of the river, and without that support the river would disappear lower down. Assuming that there is a very material increase in the surface flow in the river east of the Pomeroy and Hooker land, and from there down to this lower cross-section, and that increase is more than can be accounted for by the interven-

ing watershed of the Verdugo, and so on, that increase comes from the underflow of the river. It comes from the San Fernando valley and its watershed; and it is caused by either retarding the velocity—either by putting a dam in, or by narrowing the cross-section below, the channel below, considerably, to force it to the surface, and by that manner the underground waters are raised to the surface. Supposing you were to take out this underflow upon this land sought to be condemned, the effect would be to decrease the flow in the river below, to the amount you take it out above.

Cross-examination.

By Mr. CHAPMAN:

I never made any investigations of the sources of supply of the Los Angeles river, and the amount of water that was flowing in it, and underneath the plain of the San Fernando valley, before I was employed by the city on the first of January. I have never been upon any part of the watershed of the Los Angeles river. I know the Ballona creek; I can't place the Cienega ranch now, Mr. Chapman. I built that road from Los Angeles down to Ballona harbor, the Santa Fé, at one time. I know the Ballona swamp; I am not acquainted with the country to the south of the city here, towards Wilmington, to any extent; any more than the Ballona road. I can't have any
860 opinion as to where the Ballona creek, Ballona swamp and the wet lands south of the city, come from, because that country is so flat, and no well-defined channels in it, that I haven't made any opinion on it. If there is a perfectly well-defined channel in the Ballona creek, until it is lost in the swamp there, of hundreds acres, I don't know of any, Mr. Chapman. I have just been along the line of railroad, as I have testified. We had to go across the swamp; and some difficulties to get across. I can't tell whether there is any mountain shed or range of any considerable extent around there. When I was down there I was building railroads then. I haven't looked at the hills there since I have been investigating this proposition. If the waters were developed upon the Pomery and Hooker land to the extent of 1,000 or 2,000 or 3,000 inches, I say it would be missed from the flow of the river somewhere; I do not know where. I have been employed in a good many water enterprises; I have been employed by the Victor Reservoir Company, to make an examination and report to them the rainfall and amounts of water and so forth, and I made a report to them. In this estimate that I have made in regard to the Los Angeles river, watershed, I have taken as the average of rainfall of the valley, 15 inches. I made up the computation from the data which all the other witnesses took as a basis. The weather reports from the meteorological bureau, I think that the California and the United States as made here. From the rainfall as it has been testified here by the various witnesses who have had their say about it, and from the same data; I had that report upon which to base my calculations. I took the Van Nuys home-ranch gauge and the

records of the San Fernando gauge, and averaged the two up; and I called the average rainfall in the valley the mean between the San Fernando station and the Van Nuys home ranch. I took
861 the average elevation between those two gauges as 1,000 feet above sea level, and the average foot-hill, the elevation of 1,700 at 700 feet, and I took Mr. Lippincott's rule, $\frac{6}{10}$ to 100 feet, to increase the rainfall. I started at the basis of 1,000 feet. I figured the foot-hills into that. In my judgment it is incorrect to commence with the seashore.

That is my reason—incorrect generally. My reason is this: To allow Mr. Lippincott as the increase of six-tenths to a hundred feet of elevation only holds good for if you start at the foot of the hills and go up the same slope as soon as you have intervening hills between your starting point, or a break in the slope, would change conditions and that rule is absolutely incorrect. Incorrect because of those conditions. I will try to answer it as plain as possible. I say, under certain conditions, that rule is incorrect. I didn't say the rule is incorrect in general. If you want me to prove it to you, I will prove it is incorrect under certain conditions. I did apply it at a thousand-foot elevation in the San Fernando valley, and then averaging the elevation of the foot-hills, I did apply the rule. It comes very nearly to be the same as an old English rule which is known to all engineers, that the increase of the rainfall on the same slope is about three per cent. and since I have no absolute accurate measurement for this watershed, I had to take the next best, and everybody agrees Mr. Lippincott is in the charge of the office here for the United States and makes this his special business, so I have been perfectly willing to apply his rule to certain conditions, but to apply it on the seashore and figure it over an interrupted plain, from the bottom where I could apply it, I knew it was incorrect, because I tried it. Taking the San Bernardino rainfall as 12 inches, it took an elevation of 1,000 feet, and taking for instance Bear valley is 48 inches of rainfall, which is about the propor-
862 tion as the rain does fall, and you apply that rule for 5,000 feet and you figure it out yourself and you can find it is incorrect. I must take my experience in other sections to prove rules correct or incorrect in this section, and I testified so in the outset, and you must permit me to do so.

Q. Well, what was your experience and observation in Bear valley and San Bernardino that led you to believe that by taking a thousand-foot level above the sea and applying the rule on the same slope, that you would get correct results?

The COURT: I still think you are mistaking the witness.

Mr. CHAPMAN. He has not stated absolutely that when he got to a thousand feet the rule did apply and at 700 it did not; what he said was that whenever you come to a basin like the San Fernando basin you had to make a new start, and that is the substance, you start again with six-tenths to a hundred feet, and that he has done with his San Fernando basin.

Mr. CHAPMAN: Well, do I understand that the court has objected to the question?

The COURT: I want you to make your question state the exact proposition of the witness and not another one which he has not made.

Mr. CHAPMAN: Well, we except to the decision of the court.

Witness resumes: I did not state that my experience and observation at Bear valley and in San Bernardino mountains was part of the experience by which I was led to suppose that in that particular instance, starting at a thousand-feet level, that I could apply the Lippincott rule. I stated, that by my experience in San Bernardino and the San Bernardino mountains I found that the rule does not apply to all conditions. The thousand-foot level has nothing to do with it; I took it as a starting point; and the rainfall at that point; then I took the average elevation of the foot-
863 hills, above that; then I did apply the Lippincott rule. There was something in my experience in the San Bernardino mountains and the Bear Valley reservoir that gave me an intimation or information that would lead me to suppose that the rule would be correctly applied to these conditions in the San Fernando valley. It was, that between the starting point and the point where I figured the rainshed there was no intermediate—intervening mountains or range of mountains, and wherever that is correct you will find that the Lippincott rule—or it is not the Lippincott rule, it is a rule known by engineers—is correct. I have put this Lippincott rule to the test to know whether it would or would not be correct in its application, in minor details, besides in San Bernardino mountains and the Bear Valley Company; I can't tell now; many times I have tried it by actual rain measure in gauges and found that in one place it is correct, and in other places it is absolutely the reverse, or incorrect. Take for instance, the rainfall at San Bernardino city, 12 inches, the rainfall at Bear valley was about 41 or 42; the difference in elevation is about 5,000 feet. Going over the Bear valley of 6,100 feet in elevation, and Holcomb valley with an elevation of about 7,800 feet, you have a rainfall in San Bernardino of 12 inches, Bear valley 42 inches, and Holcomb valley about 18 inches, at the same time. There is the Lippincott rule correct and incorrect. Holcomb valley lies somewhat to the west and to the north of Bear valley, I think. At the crest of the mountain, the watershed tributary to Little Bear valley the rainfall at Morse's house, which is about four or five hundred feet lower than Squirrel inn, may be 1,000 feet lower than Squirrel inn, is always more than the rainfall at Squirrel inn. Now, there is the Lippincott rule right reversed; it is on the same slope, however, from the crest of the mountains towards or from Strawberry peak towards
864 Little Bear valley. Now, many smaller items and items of that kind, too, that the Lippincott rule can't be applied directly—it depends on circumstances. I know that the Lippincott rule as stated by him was applied to large areas of country; and I know that in large districts of country there is almost universally found differences in the amount of rainfall at different localities, affected by merely local conditions; I know that the Holcomb Valley problem is one that must be due to local conditions, according

to anybody's rule. The Holcomb valley forms the headwaters of the east branch of the east fork of the Mojave river, and the Mojave river flows off into the Mojave desert. In substance, the application of the Lippincott rule gives a less rainfall than actual tests have shown to exist.

Q. So that if the Lippincott rule happens to be applied in a case where the rainfall is not affected by local conditions to diminish it, it is not high enough in its estimate at all.

Witness resumes: Mr. Chapman, I think you assume facts which do not exist; you assume that the Lippincott rule is wrong—at least facts which I did not testify to—where it is not influenced by local conditions. Certainly, if that is entirely a hypothetical question and assumes something which does not exist, I must say yes, you are right. My estimate is that the rainfall was 15 inches on an average in that valley. If I figured it I could tell you in miners' inches, what I would give for evaporation and plant life. I haven't figured it: it is easy to figure; so many square miles provides so much and it takes 365 days to run it off. Of course you have to state the time; I am taking miners' inches for a year; will figure it out for you. I have allowed 60 per cent. for this valley run-off in floods—60 per cent. of the one inch that is left, and I have allowed 40 per cent. of the one inch that is left for percolation. I have not figured what percent-
865 age of the whole I have allowed for plant life and vegetation. On the foot-hills I make the average rainfall 19.2 inches; I allow 13 inches of that for plant life and vegetation; then I say that upon that tract I allowed 60 per cent. for the flood run-off; the same as the valley; and 60 per cent. and $\frac{2}{10}$ inches, I allow for flood run-off; 40 per cent. of this same 60.2 inches I allow to percolate into the soil. On the mountain shed I allow 12 inches, for the plant life. The mountain-shed rule I have by about 8 years' measurements, in the San Bernardino mountains, commencing at 1888—it is about 5—well, yes, 1888, and ending about 1893. I never have been up over the mountain shed of the Los Angeles river. I know in a general way how the two sheds compare with each other in the mountain vegetation and plant life. What I know about this I know from hearsay. In San Bernardino mountains I measured about 34 different streams for four years. I measured the Mojave river for three years. I measured Lytle creek for about two years and a half or three years, commencing in '87 and ending about '95. I measured the streams of the mountain watershed tributary to the Arrowhead Reservoir Company. They had measured under my direct supervision about thirty-four or forty streams, different small and large mountain streams in that mountain shed; that was done during three years or longer, four years—from 1888, to 1892. That included the years 1889, '90, '91 and '92. I think the floods of 1884 and '87 were rather heavier than '89. '84 and '87 I didn't observe as closely; I was then with the railroad company—no, not in '84, I was not with the railroad company; in '87 I was. I observed the water in '89. Of all the floods I have ever observed, I think that of the year '89, was the worst one and the greatest one.

I have at various times taken the trouble to examine the reports of the rainfall in this section of the country to ascer-
866 tain what was the greatest quantity of water that fell in the month of December or January or February of any one year, but I can't give you now the figures. I have got a copy of the report of the weather bureau of Los Angeles city for the rainfall in this city for the last 12 or 14 years. (Refers to pamphlet.) This report gives for '84 the heaviest average rainfall. It may be that same report gives for the rainfall in Los Angeles city in December of 1889, 15.80 inches; I have not got the details, I have got only the annual rainfall. I have not got the details of any year here in my hands, but from recollection I might say I think you are right, that the heaviest rainfall was in December—15.80 inches in December, 1889. I don't think there was ever another month since I have been in this country, or since I have made any report, where there was half that quantity fell. I have stated that the run-off from these mountain slopes will be immensely greater in its percentage in the case of a flood occasioned by such a tremendous rainfall in so short a time, over what it would be in the falling of the rain ordinarily in the winter season; and I have seen it rise as high as 98 per cent. In my estimate of the quantity of water to be allowed for run-off in this basin in the foot-hills and from the mountain shed, I have not been influenced by any of the observations and reports of others concerning these things, that I know of. I have consulted the reports of other scientific gentlemen concerning the proportion of the run-off of the flood waters, and the amount to be allowed for evaporation and plant life! but I have not been influenced by these estimates made by other people. I have taken my own observations and others' observations. I have compared the results of scientific works with the results of the reports of the Geological Survey and I find they are coming within the limits; so I either verified
the work of the Geological Survey or verified my own,
867 just as you please as you think. I mean by "coming within the limit,"—the run-off is limited, and it is conditioned, as I said before, the run-off in storm water limits itself from almost nothing to 90 per cent., of the available water, deducting waste for plant life and evaporation first—98 per cent. Now then, the evaporation and loss by use in plant life, which is not evaporation, which cannot be separated, is always limited by extreme limits in valleys from 10 to 25 per cent., in mountains from 12 to 10 rather to 15 or 16 inches —not per cent.—I said per cent. before, but that is wrong—15 inches, which, in those limits, would stand a constant loss, depending on different conditions, and that is what I mean by limits; and also the run-off in storms depending how the rainfall is not alone on the mountains. If you have cloud-bursts and torrents it is almost 98 per cent. running off in a storm. If you have heavy rains following light storms it is 90 to 98 per cent. If you have light storms coming after a dry season, you have less. It is not only the topographical condition of the country, but also the condition in which the rains are falling. These reports of others, which I have studied their estimates, have been made in many instances by the results

and observations on large tracts of country, in which the various classes of country are divided according to its topography, rolling pla-ns and foot-hills and mountain watersheds, and they have some rule by which they have arrived at approximately an average run-off and consumption by evaporation and plant life.

Q. And in what district of country, taking all classes of land together, have you ever found the evaporation and plant life foot up as high as 70 or 80 or 90 per cent.?

Witness resumes: Mr. Chapman, your question is not clear, because the evaporation and plant life is not always 70, 80, 90, or 100 per cent.; it depends upon the amount of rainfall. I don't
868 want to answer that question because you will say I said something which is not so.

Q. I say, from what report have you ever seen an estimate of the average consumption of plant life and evaporation applied to a considerable district of country where all of these classes of lands are found, foot-hills, mountains and valleys, where the amount allowed ranged as high as 70 per cent.?

A. For what rainfall?

Q. For any rainfall, one inch to a billion.

A. Well, that is not so. At one inch it takes all the inch of rainfall to make up your plant life, and at a billion inches, it takes only 12 or 25 inches, and therefore you get your per cent., and your per cent is incorrect.

Q. I didn't say anything about whether it was incorrect or not, I asked you if you ever found an estimate of that kind made by anybody else except yourself?

A. Mr. Chapman, I never made that estimate; I am not fool enough to do it.

Q. You got it from others, didn't you?

A. Well.

Q. Did you get it from others?

A. I have not got that estimate from others, and I have not testified to anything of that kind.

Q. Have you figured on what your average would be by your statement of the facts as you think they exist there?

A. If you assume a certain amount of rainfall——

Q. Will you just please answer me one question, and then after that I will listen to you talk for an hour.

A. Well, I can't answer a question that has no sense.

Witness resumes: I have made a calculation in so many inches but not in per cent., for the purpose of ascertaining what, according to the figures which I have testified before this jury, the average of the whole district would be of the evaporation and plant life; you done the figuring on per cents. I said my average in inches is for the valley shed between 12 and 24 or 25 inches.

869 Q. Well, unless you want to hear yourself you needn't talk that, because I am asking you if you have ever made any estimate of what the average would be over the whole district, not on one class of land——

A. I believe so.

Mr. DUNN: I object to the question.
The COURT: He has a right to ask him.

A. I didn't say so.

Witness resumes: I examined the excavations that were made on the Pomeroy and Hooker tract; I did not examine any of the wells that were bored there by the defendants, Pomeroy and Hooker, or under their direction. I didn't examine the wells that were bored there by the city of Los Angeles, or under its direction; I examined the maps—the results. I didn't examine any of the wells that have been either dug or bored in the San Fernando valley.

Q. In your description that you have given to the jury of the way the water comes down into the San Fernando valley, you used the fingers of your hands to show us how the streams come flowing down there. From what data did you derive your knowledge of those fingers?

A. From the following: In all southern California, the stream beds are made up by washings from the mountains and debris. As long as those mountains are confined to narrow canyons—the water is confined to narrow canyons and to a smaller area, it brings down the heavy boulders and cobblestones and debris to get always the sand. When it comes further to the valley, those boulders deposit in deltas, nearer to the foot-hills, nearer to the mouth of the canyon, and the lighter material is carried on until the velocity of the water gets so small that also the sand is deposited; and consequence of—you find always the heavy, coarse material with large interstices near the mouth of the canyons, and the lighter, sand, smaller gravel, further away in the course of these washes.

870 Witness resumes: Those fingers give out further out in the plains; and then after proceeding for some distance into the plain, these waters that come through mingle all together and go on down through the material of which the land is composed. We went up on the Los Angeles river above the Pomeroy and Hooker tract; I don't think I saw the extreme head of the Los Angeles river. I haven't seen where there is any flowing stream starting on the surface of the ground in the San Fernando valley; I didn't go up. We went as far as the Pirtle development, and from there on we went south to a cienega—I have forgotten now the name of it,—laying in the southwestern portion of the valley. I haven't really paid any attention to the distance it is from the southwestern side of the Pomeroy and Hooker land sought to be condemned here; it must be several miles. In my opinion, the surface flow of the river of Los Angeles is a part of the underflow. By that I mean, there is no doubt that this same underflow of which I have been speaking, is, from some causes or other, whatever they may be, brought, in part, to the surface of the ground and constitute the waters of the Los Angeles river; and it is my opinion, that an excavation made along this tract of land anywhere there, that developed any water, would affect the flow of the Los Angeles river. I don't see how I had the means at hand of verifying that opinion, if I had seen fit to do so; the excavations were there, but

those excavations were there too short a time. It doesn't alone diminish the flow of the river in quantity; it diminishes in time. When you have two vessels, or two pipes running out of a vessel, you lower the surface of that level in that vessel, and soon, when time is up, both begin to run dry. If you had another pipe running more water into that vessel than both your pipes are getting out, the water would then run over, and keep on running over. We measured the weir
871 at the eastern extremity of the land of Pomeroy and Hooker, I think; it's marked on the map "Upper weir." I got the 2,500 inches at the eastern extremity. I was not present at any of the measurements made in the river further down. We measured the water that was flowing in the Los Angeles City ditch, called the main supply ditch. The water flowing in there at weir No. 1 was 506 inches; that was near the eastern end of the ditch. And weir No. 2 was 471 inches—that's near the head of the ditch. And there was one more weir measurement taken, of which I have no record. I have got the position reversed; the weir No. 1 was measured first and the other last. We had more water in the upper weir than we had in the lower weir. The measurement at the eastern extremity of the Pomeroy and Hooker land of 2,500 inches includes the ditch. I figured that at 471. I stated that the average rainfall at the city of San Bernardino, was about 12 inches. I get my information from the different rain gauges we have there—for years. Dr. Johnson keeps the United States rain gauge there. I could not tell you in what country the observations were made to establish the English rule of which I spoke, which approximates this Lippincott rule, and which English rule allowed three per cent. increase for each hundred feet,—it must have been in England, and India, but I don't know. I have not the data of the rainfall at San Bernardino before me. I have not examined the report of the Signal Service station upon that subject. I have seen the report made by General Greeley, the Chief Signal Officer, and Lieutenant Glassford, of the rainfall in southern California. I did not take my statement from that. I took it from my recollection for the last years since I lived in San Bernardino. It is no particular report—record of anything except this: When I told you about the rainfall in San
872 Bernardino being 12 inches, I knew that at the time in Bear valley it was about 42, and I knew at the time—in the same year, in the Holcomb valley it was about 16 or 17; something like that. I gave you this all by recollection, and I have got the data all in my possession, and if you wish for them I shall telephone and get them here.

(To Mr. DUNN:)

I did not state an average rainfall at that time, but was stating the comparative rainfall for certain years.

(To Mr. CHAPMAN:)

Dr. Johnson is keeping the *the* rain gauge in San Bernardino, from whom I got my information. If I am not mistaken I get it

from the bulletin put in the paper. But the rain gauges in Bear valley were kept by the Bear Valley Company, and the rain gauges in Holcomb valley were at that time kept under my special supervision, by the Arrowhead Company. The keeper of the dam of the Bear Valley Company, I think, is the official rain-gauge keeper for that company.

Q. Did you make any computations at all upon the rainfall in the Verdugo watershed,

Mr. DUNN: That's objected to on the ground it is incompetent and not proper cross-examination.

Mr. CHAPMAN: He testified in regard to the amount of water that would flow through this cross-section.

The COURT: Well, that was altogether on statements that were assumed; not on any observation that he had made.

Mr. CHAPMAN: And he said that he didn't think there was less than 300 inches, nor more than 800.

The COURT: Yes sir, on those conditions. It was simply his opinion as a civil engineer and an expert in those subjects as to how much water would naturally flow there under the conditions named to him in the question.

Q. Did you make any investigation yourself, Mr. Keobig, on that subject?

A. No, not here.

Witness resumes: The evaporation is greater as flatter the
873 country gets, and as more porous the country is. It's less on steep mountain sides, and on rocky mountain sides it's still less. And then also, the plant life has a great deal to do with evaporation. Evaporation is plant life. The greater the surface of the plain over which the same amount of water is spread, the greater will be the storm evaporation.

Q. Well, how would it be in the case of cisterns or reservoirs. Would the evaporation be greater, or less, than over the plain surface of the San Fernando valley, or other countries of like——

A. I think it would be less.

Witness resumes: The exact proportion I cannot give you as I haven't prepared for that—neither from data of myself nor from others; but I am satisfied that it would be a great deal less, because the water in the reservoirs is kept in contact on the surface; and consequently it isn't spread in particles over through the ground; which would make the evaporation more. And furthermore the water in reservoirs is kept cool on the surface—cooler than the surface of the earth is, and that makes the evaporation less. It is kept cooler from the lower temperature of the reservoir itself. Certainly a great big body of water is cooler under the same temperature in the air than if you spread that water through a sieve—particles here and there through the sand.

Q. Yes; but how is it kept cooler. That is the question? What is it that keeps it cooler?

A. Well, I haven't prepared for that deep examination, Mr. Chapman;

Q. Well, isn't it because the water from the bottom of it comes up and supplies that which is constantly going off in the air, through the process of evaporation?

A. No sir; water as it gets cooler gets heavier, until it reaches four degrees of Fahrenheit; and below that it gets lighter
874 which keeps the fishes from freezing in ponds and rivers, and the surface freezes on top.

Witness resumes: It evaporates on the top because of the effect of the heat. And as fast as it evaporates it is supplied from below. I think on the same surface the evaporation would be less in a reservoir of water unmixed with any other material than it would be on the surface where it is in the ground, for the simple reason, as stated, that is is kept in a compact mass. A square mile of reservoir has more water than a square mile of ground; and therefore evaporation would be less—it comes in contact all around with particles of heated sand. Suppose I had an acre of gravel bed of a depth of 55 feet, and a reservoir with a surface of an acre, with the water 55 feet deep, both full of water; I think the evaporation would be the greatest from the gravel bed. As I stated I have no idea about what proportion. I made a report on the Victor reservoir enterprise. I would like to see the report because it was made so long ago that I don't know what there is in it. (Same handed to the witness.) I stated that the average evaporation was 8 per cent. on the depths of that reservoir, being an average of 55 feet, in covering 7,700 acres. That's what I stated. It was 50 or 55 feet deep at an average.

Redirect examination.

By Mr. Dunn:

The book or report which has been shown me is a prospectus that I made for the promoters of the scheme, to be used, perhaps, in pushing this enterprise and floating bonds, or something of that kind. But the statements that are made in there, I think there are made in the same line as I made today, in every particular. The amount of evaporation on a reservoir depends very largely on
875 the country where the reservoir is situated, the character of the climate, and wind currents, especially—hot wind currents, high winds. This particular reservoir that I report on is located at Victor, at the foot-hills of the San Bernardino mountain shed, on the northern slope of the San Bernardino mountains, on the desert slope. If I stated in cross-examination that if the underground waters were taken out of this land I didn't know where it would affect the surface flow, I made a slip. It will affect the river to the full extent of the raising of the river in lengths, from beginning to the end. I was asked where I got my illustration regarding that underflow, where I used the illustration of my hand. Mr. Friel used the same illustration; I didn't use it because he used it.

Recross-examination.

By Mr. CHAPMAN:

Well, Mr. Chapman, I don't know how I put my hand. I haven't studied stage art. My experience in life in that very thing is eight years. I am not going hand-raising because somebody else does. The fact that I was writing up an enterprise to help promote or to float bonds wouldn't induce me to color the statements made in that report. I don't make any business of selling bonds or writing up enterprises for the purpose of selling bonds, or else I would be doing a better business than I am now. I certainly didn't overdraw that matter in regard to that watershed.

Cross-examination.

By Mr. CHAPMAN:

I stated in my direct examination that the area of the cross-section at this so-called narrows is 176,000 square feet; and I also testified that in my opinion, the amount of water that could
876 percolate through there, outside of the surface flow, is not less than 300 inches, and not more than 800. I haven't calculated at what velocity it would have to flow in order to flow the 300 inches, but I can make the calculation. I haven't calculated the velocity for either the 300 or 800 inches. I got at my estimate by taking the yield of water coming out of the Los Angeles river, for instance, or the Pomeroy cut, or out of the cut made in the Ferguson ranch in Lytle creek, or other underground developments, and figure the number of miners' inches to the square foot of surface exposed. And compare that with the number of square feet in this cross-section. I didn't take into consideration the velocity at which the water was moving at all but I think the velocity is limited by the yield; if can be figured, from this data I gave you. I don't know how wide I figured the cross-section; it is in evidence; I took the figures given here on this map; I just took the number of square feet given in evidence, the testimony of Mr. Eaton, and figured out from this map. The widths and the depths and so forth. I didn't go into particulars in it. My whole testimony in that respect is not just based upon the assumption that the yield here would be no greater than in those places that I had made my observations; that wasn't the basis. In my opinion it doesn't make much difference whether that watershed yields six or seven thousand inches. The velocity in which that water comes down to this lower cross-section is governed by the resistance the under-current flow meets coming to this gravel bed. Whether you have a great deal of water, or less water, it will not change the velocity very much. So the discharge, in reaching this lower cross-section, will be an even quantity; I do not believe that the underflow of that river varies very much with the excessive or less rainfall, at this point. I think I gave you
the basis upon which I computed there was not less
877 than 300 nor more than 800 inches passing through that cross-section. I did not assume the yield was so much, and

there was from 300 to 800 inches to be accounted for, and that would pass through, and no more. I done it in an experimental way, as I stated in the outset of this examination. I took the river bed of the Los Angeles river. A thousand inches are raising in that from a certain point to a certain point; in the Hooker and Pomeroy land. Now then, that river bed is 40 feet wide, and is about 13,000 feet long, in which this thousand inches rises. Gives me 479,000 square feet. Now then, that yield, according to my own measurements, about a thousand inches, a thousand miners' inches continuous flow. And in that way I get about $\frac{2}{1000}$ of a miners' inch to the square foot. Applying the same velocity to this lower cross-section with the 176,000 square feet, I receive 352 miners' inches for the whole cross-section. I didn't apply any velocity to it, but, in order to tell you that you might know the velocity with which the water comes out in that particular case, it is about half a foot to the hour. I have given to you, all the time, the basis upon which I figured out there was no more than 800 nor less than 300 flowing through there. Then I took that section of the river, or that area of the river, yielding $\frac{2}{1000}$ of a miners' inch to the square foot per second, and multiplied the $\frac{2}{1000}$ with the 176,000 square feet, which will give me 350 miners' inches. I was endeavoring to tell you that, assuming the facts that these materials in both the river bed and that cross-section are the same all over that land, the yield would be, in proportion, so much. And I also stated to you, that about half a foot per hour is the velocity with which that water comes into the Los Angeles river. In my judgment I gave you the limits of the capacity of that cross-section, to pass the water through. If there were 10,000 inches of water
878 flowing underneath the soil down to that point, there could only be, in my opinion, an amount of 800 inches that would pass through under ground, and the balance would have to rise to the surface. I endeavored to make it clear to you that I did not take into consideration the question of velocity with which it moved in determining that capacity.

To the COURT:

There are several methods of determining how fast water moves in a place of that kind. I figured on several methods in this case to determine what the quantity was. Whether I applied them or figured on it, is the same thing. There is an old test, given by several engineers of older date, that would give you a velocity in this gravel bed of about between 14 and 18 miles per annum. Other tests, which have been made recently, and the attestation of the agricultural department of the State of Colorado, would give the velocity about 800 feet per annum. In my opinion no tests can be applied for the purpose of ascertaining what was the actual velocity of the water in this cross-section. I told you I figured on them and gave you the results. I threw it out as unreliable. The actual velocity would depend upon the grade, the inclination of the water plane and the material through which it was passing; and the

greater velocity that it had, the more water could pass through in a given time.

Redirect examination.

By Mr. DUNN:

I testified that I had made some estimates and observations regarding the run-off of the Mojave River watershed, particularly and more correctly, for the years '92 and '93. The figures I gave you were measured at the narrows at Victor, which took in the entire watershed of the Mojave river. And commencing December 14, 1892,
879 and ending November 28, 1893, there were about from 30 to 40 measurements taken of the Mojave river; and during the time between December 14, '92, and May 28, '93, there was an average flow on the Mojave river—the average run of the Mojave river, of about 60,000 miners' inches. Between the time of May 28th, 1893, and November 28, 1893, there was an average run-off of about 4,000 miners' inches. About 94 per cent. of that stream was storm-water run-off. It would be called wasted in this case. I didn't take the run-off any other year there so accurate as this. The next year from '93 to '94, it would give a run-off for the flood season of about 86 per cent.; but the measurements are not so satisfactory as the one for '92 and '3; the one of '92 and '3 is the result of accurate measurements. I have seen the formation and heard the formation described, of this lower cross-section, the narrows; I also heard the description of the wells and cuts showing the formation at the Pomeroy and Hooker land. Supposing the inclination to be the same the velocity of the underground water here would be much greater than it is on the Pomeroy and Hooker land, to run the same amount of water through, because it has to run through a smaller space. There are only two possible ways for the water to get out. Either it has to have a very very large velocity, or would be raised to the surface; one of the two.

Recross-examination.

By Mr. CHAPMAN:

I do not know what the total rainfall in the Mojave River watershed was in '92. I haven't testified to the percentage I made the run-off. I did testify to something about the Mojave desert. I testified to the percentage of run-off during the storm season in comparison during the balance of the year. It was 94 per cent.
880 of the entire run-off. Under the term "run-off" I included everything coming from that watershed except what is wasted for plant life and evaporation; and that, therefore, included the percolation and the waters flowing in the stream on the surface, both during the flood seasons and through the entire year; everything that I didn't allow for plant life and evaporation I classed under the term "run-off." But there are two classes of run-off, one goes during the storm season and one goes in the ground and supplies the flow of the river during the summer time. Now, if I esti-

mate for reservoir purposes I take the yield of that watershed in of the total run-off. If I estimate only the flow of the river tributary to that watershed, I take the storm water because that runs off and is lost. If I made a report on the results of my investigations of the flow of the water of the Mojave river and its watershed that year, I made it to the directors of the company. I remember that I did make it to the directors of the company; they know all about it. I can't remember what I stated to them was the amount of water flowing on the 20th of October, 1892, in the Mojave river. I think, as far as I can remember—my memory may be wrong; but I think I did not report the total flow, both on the surface and underneath the surface during that year. I believe I made this report: "The valley of the Mojave river forms a large basin of about 14 miles long, and from a mile and a half to 4 miles in width. This basin lies in the foot-hills, and its upper edge is only a few miles from the exit of the river out of the San Bernardino range of mountains. The lower end of this basin is cut off from the balance of the valley by a ridge of granite mountains, which lies almost perpendicular across the basin, forming a narrow neck, through which the Mojave river finds its way downstream. At this point, and for several miles downstream, to a point called the lower narrows,
881 the Mojave river has a steady flow all the year round. The rock river bed being filled with sand and gravel for about 30 feet in depth, shows a considerable underflow, or subterranean flow. On the 20th of October, 1892, the flow of the Mojave river was measured by the undersigned, and gave 13,000 inches under a four-inch pressure. On the above-named day the Mojave river was as low as known for years, being at the end of the dry season, before any rains in the mountains has occurred. Year 1892 is know- in California as a dry year. Consequently, the testimony given by settlers in that vicinity, stating that the flow on the 20th of October, 1892, was as low as ever before, can be taken as a true criterion of the minimum flow. It is also stated that the low stand of the water continues for about 260 days in the year. Assuming that the river has a continuous flow of 13,000 inches, under a four-inch pressure, for 260 days, measured at the upper narrows, there would pass through this place, during the 260 days, 43,940,000,000 gallons of water. It is further well authenticated, by reliable persons who live in the Mojave valley, and are familiar with the flow of the Mojave river for the last 20 years, that this river never flows less than two feet in depth during the period from about February the 1st to May 15th of each year, even in the dryest year; but that during this time, frequently floods occur which would raise the river to eight and ten feet in depth. At the upper narrows, where this flow is observed, the width of the river is about 140 feet; and, at a depth of two feet, the velocity is about five feet per second. I had occasion, a few weeks ago, to observe the water at this place flow in at a dept of 4½ feet, with a velocity of ten feet per second; and I am assured that floods of still more gigantic nature repeat themselves very often in this river during the winter time.

882 The drift wood below, in the valley of the Mojave river, shows that these floods are often so enormous as to cover the whole valley for miles. Now, during the period of 105 days, through which I am assured the flow of the Mojave river is generally not less than two feet, there would pass through the upper narrows, a continuous flow of 70,000 inches of water, under a 4-inch pressure, or about 95,950,000,000 gallons of water. If we summarize the above as we have, during a dry year, or a year of minimum rainfall at the upper narrows a flow of 43,949,000,000 gallons for 260 days, and a flow of 95,950,000,000 gallons for 105 days; or a total flow of 129,490,000,000 gallons for one year; not taking into consideration the enormous subterranean flow known to exist at this place in the Mojave river. The water crop of the watershed, however, shows a minimum yield of 166,412,000,000 gallons, or 26,922,000,000 gallons more than the flow of the river in the same year; which can be easily accounted for by taking into consideration the subterranean flow of the river. If we should add to this again, the water flowing through the Mojave river at flood times, we would get the flow of the Mojave river in any average year. If you have it there on the report, I certainly did so. If you have got the pamphlet there, with my signature under it, Mr. Chapman, I think there is no doubt about that.

Mr. DUNN: We will offer it all in evidence, the whole report, and ask to have it marked.

Mr. CHAPMAN: Mr. Koebig's report begins on page 25 of this pamphlet and ends of 34.

Mr. DUNN: We will offer that part of the pamphlet in evidence as a whole.

The COURT: I don't understand what the question is for or what it has to do with the matter which the witness has just been examined on.

Mr. CHAPMAN:

Q. Well, I will ask you if the report wasn't correct, in your opinion, at the time you made it.

883 Mr. DUNN: That is objected to on the ground it is incompetent, irrelevant and immaterial.

The COURT: I will sustain the objection.

Mr. CHAPMAN: Exception.

(To Mr. DUNN:)

I stated in reply to a question from Mr. Chapman, that a reservoir an acre in extent, in area, of water, taken with an acre of saturated gravel bed, that the evaporation from the saturated gravel bed would be much the largest. In doing that I assumed that the saturation at the surface would continue all the time.

W. B. SCARBOROUGH, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My business is real estate and insurance. I have lived in the city of Los Angeles eleven years, and have been in the real-estate business in the city of Los Angeles about nine years. I am acquainted with the property which is sought to be condemned in this case, a tract of 312 acres owned by Pomeroy and Hooker on the east end of the Providencia rancho on the Los Angeles river; I have gone over it and examined it all. I am acquainted with the value of that kind of property, in and about that vicinity. I think the value of that property as a whole during June, 1893, is not materially different than it is now. I couldn't say that the market value of 312 acres alluded to, was beyond $7,500 now. I have been all over the property; examined the mesa land as well as the low land. In my opinion its value is not to exceed $7,500.

Cross-examination.

By Mr. CHAPMAN:

I am considering the property as shown on a similar map to this as being the land taken in this condemnation suit. I consider it without reference to its water value. I am not altogether
884 considering it without reference to the use of water upon it for the purpose of cultivation. I went over the land during the last 30 days, at the instance of the city.

Mr. DUNN: At my instance. I will admit all these witnesses did, to shorten the matter.

Witness resumes: I have lived in this city eleven years and one month; my business is real estate and insurance. I do own real property in the city of Los Angeles. Mr. Thomas and the city engineer was with the party I was with, and showed us the land. Mr. Thomas is the deputy city attorney. We went over almost all of the land from the extreme westward point to the eastern boundary. We went out there in a carriage; we went over the land pretty much altogether on foot, some places we used a carriage. I had not been over this portion of the land before; I have been over the land beyond on the mesa. I have dealt in lands some little in the Providencia rancho; more in the Lankershim rancho. I don't know that I can tell you from memory just where we had lands in the Providencia rancho; we have had lands for sale all over that rancho, I presume. I don't know that I ever sold a piece of land in that part of the Providencia rancho. That I have sold more in lots in Providencia, right up near Burbank. I do not know of any sales made in that tract of my own knowledge. I have seen sales recorded that were made there and have heard them spoken of, but none of my own recently. I know of a good many for sale there at the rate that I am putting on the better portion of this land—sixty dollars an acre. I am putting an average there of about

twenty-five dollars an acre. There has never been any land offered for sale in that vicinity, such as we are called on to value there. I never knew of any lands of any kind being sold in that vicinity for twenty-five dollars an acre.

885 In making up my estimate of the value of that tract, I made an itemized estimate of the several different kinds and qualities of land in this tract. This mesa land, there is perhaps two or three qualities of the mesa land, and there is the mountain land and that which has heavy timber on it, and that that has no timber on it; that is the way I have divided it. That is three or four different kinds of land. I really estimated that there was so many acres of mesa land at such a price—about 36 acres, I think, at $60 an acre. There is a classification of bottom land, there is about six acres of bottom land there that has a pretty fair soil and if the timber was taken off of it, could be perhaps, susceptible of cultivation, six or seven acres; I valued that at $25 an acre. That is a little piece in the extreme western corner of the tract sought to be condemned. Then there is some 15 or 20 acres perhaps, of hill lands, at $20 an acre. Then there is about 65 or 70 acres of that bottom land that has heavier willows on it than the other that I was disposed to value higher than the balance of the tract; I valued that at $50 an acre. The balance of the tract has a light soil with nothing on it; that I just simply called sandy-bottom land, and valued it at $10 an acre. There is about 160 acres of it. All together I have accounted for 313 acres. I had about 36 acres of mesa land; about 15 or 20 acres of hill land; there is two points that I took into consideration. There is about 70 acres of the heavier timber bottom land—65 or 70, about 160 acres in this bottom land that I valued at $10 an acre. There are 36 acres of mesa, 30 in one place, 5 in another and 1 in another. That should leave about 26 acres really. There is 26 acres in the corner there that is represented by the map to be 26 acres, and I supposed from going over it, it is somewhere in the neighborhood of that amount which I valued at $20 an acre, a 26-acre piece in the corner. The 160 acres which I valued at $10 an

886 acre lies on either side of the river from one end of it to the other. It varies in width; about the width as shown on that map there. I examined it. It is wider at some places and farther from the river at some places than others. In some places the lines of it are parallel to the boundary line, and in some places not. Sometimes the bank runs down nearer the boundary lines than others. We made a pretty close examination of the 160 acres, spending the whole day's time on it. We made such an examination as would satisfy us with reference to the point that we wanted to arrive at in making an estimate of the value of the land. That examination was a personal one.

(To the COURT:)

We went over it and looked at it, walked over it and saw it. We didn't have time to dig any wells on it; we saw some that had been dug. We saw the character of the soil where it was dug up. I

spent all my early life at agricultural pursuits. I think it extremely doubtful whether that land that I have valued at $10 an acre has an agricultural value or not. If of any value it certainly could not go beyond $10 an acre. The most of that land that I valued at $10 an acre is sandy land, land without any apparent soil, land that perhaps has a strata of quicksand all under it and susceptible of overflow, perhaps never could be made to be otherwise. My notion of its susceptibility to overflow had a good deal to do with the valuation of the land; that together with its general soil. I have been out here in Los Nietos county, to Ranchita. The sand that has been deposited along the main road that runs after you cross the San Gabriel river to Whittier, is more or less like this. That that was carried there by water perhaps was quite as deep as anything which I saw there. I have seen some on the Los Nietos valley. Some portions of a strip a mile or a mile and a half across that river bottom, were just as sandy as where I was
887 on this land. I have no practical knowledge as to whether they raise all kinds of crops on it, alfalfa and walnut trees and all other things that are grown perhaps in the country, excepting citrus fruits.

Redirect examination.

By Mr. DUNN:

I testified that I never had any land just like this to sell down there for any particular figure. I never knew any customer on earth to want any land like this; it is extremely difficult to sell.

Mr. DUNN: We will admit he has heard of the city of Los Angeles, and that it exists.

(To Mr. CHAPMAN:)

I do not know of a sale of a tract of land to a man by the name of Markee right adjoining this tract, partly lying on the same river bottom and partly on the mesa six or seven months ago. My business now is real estate.

W. H. COOK, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

I have resided in Los Angeles; my business is real estate; have lived in southern California about 9 years, and in the city of Los Angeles about three years. I lived in the city of Monrovia before I lived in Los Angeles. I lived nearly 9 years in those places. Have been in the real-estate business in southern California three years; was in the lumber business and banking business before that. I have examined the land sought to be condemned in this action, the tract of 312 acres lying along the surface flow of the river at the east end of the Providencia rancho and owned by Pomeroy and Hooker. I examined the land last Monday, I think; went all over the prop-

erty in a carriage as far as we could, and walked the balance of the way. I think we examined all the classes of the property; that was our intention. I made up my estimate of the market value
888 of that tract, something after the same style that Mr. Scarborough did his; the gross amount was $8,030. In making that estimate I estimated the value of the different classes of land. Mr. Thomas showed me the lines of the tract; I had a map with me at the time.

Cross-examination.

By Mr. CHAPMAN:

I was not with Mr. Thomas and the city engineer and Mr. Scarborough at this time; it was another trip. I never have sold any lands up there. I don't know that I ever knew of anybody else selling any class of land up there for any such price. I have never lived in that vicinity; never cultivated any lands along in that section of the country. I have a general idea of the value of lands, I think, throughout the country, pretty well. I have sold more land in the vicinity of Monrovia than anywhere else, being better acquainted there. I don't think I run a sort of an opposition to Burbank. I own real property in the city of Los Angeles.

J. D. SCHUYLER, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I did not state the area of this watershed, in my opinion. The area as represented on this map prepared by the city engineer, is 458 and a fraction square miles. I think it was stated that that area was taken from the watershed map of the State engineer's report. The witnesses for the defense have given the area as in the vicinity of 480 square miles. I do not know what area the Wheeler survey gives it; the areas have been computed from different standpoints; different computations have been made from the different starting points. I have formed some opinion of the amount
889 of rainfall in this watershed. The computation of the rainfall of this watershed I made on the basis of the records kept at the different stations in the watershed as compiled in the city engineer's office, and the records of the Los Angeles station, and to them I have applied a rule which I have used for 20 years or more, laid down by an English authority, which seems to coincide very fairly with Mr. Lippincott's rule; that rule is that there is an increase approximately in the rainfall of three per cent. for each 100 feet of elevation. I have estimated the probable run-off of these watersheds from other data than rainfall. In preparing my estimates as to rainfall I used the same table which has been used by the other engineers.

Mr. DUNN: For the purpose of identification, we will offer this table in evidence, for whatever it may be worth; it is the same table

that has been constantly used. (After discussion.) I will withdraw the offer and let them compare it.

Witness resumes: For estimating the value of the rainfall on the valley portion of the watershed I took as a mean the record of the San Fernando gauge and the gauge recorded at Van Nuys' home ranch; it is a mean of about 15 inches. For the foot-hill portion of the shed I estimated the average elevation above the sea level to be 1,500 feet, and using the rule of the increase of three per cent. I got a precipitation of 19 inches as a mean for that portion of the watershed. For the mountain portion I took a mean elevation of 2,700 feet, and got the mean precipitation as 27½ inches. My division of the watershed into classes are the same divisions made by Mr. Lippincott in his testimony. I checked them as closely as possible and I thought they were as fair a separation of the different classes as I could make myself. My different mean elevations were elevations used by him. I don't know whether my rainfall was the rainfall
890 used by him. I think the result of my calculation gave the mountain rainfall some less. In computing the probable percentage of the run-off on the different portions of the watershed I have used what is known to engineers as the Newell curve, which is an expression of the relation between mean precipitation and mean run-off. I have used that curve considerable in the past two or three years, and have had occasion to check it from observations of my own, and have plotted a diagram representing the curve some 40 different points, representing the actual measurement, all of which fall below the line of the curve; they would all represent a lower run-off that the curve would call for, but using the Newell curve I find that 179 square miles of mountain watersheds would yield—that about 27½ inches in depth would be a precipitation equal to 18,130 miners' inches, of which, according to the Newell curve, 52½ per cent. would be run-off, which would yield 9,520 miners' inches. The foot-hill portion of the watershed, 127 square miles, with 19 inches precipitation, would indicate 8,890 miners' inches precipitation, of which, according to the Newell curve 20 per cent. is run-off. That makes 1,778 miners' inches run-off. Of valley watershed 182 square miles, with 15 inches precipitation, the precipitation would represent 10,057 miners' inches. But, according to the Newell curve about 4 per cent. of that runs off, and the balance goes to evaporation and plant life. The 4 per cent., that 400 miners' inches, would make a total of 11,700 miners' inches, of which I allow 60 per cent. as run-off, in the period of floods which occurs in four to six months, 40 per cent. being the normal flow of the remainder of the year; 40 per cent. total would give a net yield of 4,680 miners' inches. I have made use of the Newell curve in a great many instances, and applied it to a great many conditions; I have collected data from my own observation, and from the
891 records I could obtain in about 40 different cases. Some of this data was obtained from the measurements of the watershed of the Spring Valley Water Company in San Francisco, where there are opportunities for the exact measurement of the flow of

the watershed, afforded by reservoirs built in such way as to collect all of the water that falls off. To my mind that presented the only really accurate way of arriving at the run-off, was to find instances where it had been actually measured and compare it with actual rainfall, and I directed my attention in that line of the subject more than to computations of rainfall. To illustrate, take the cross-section marked "Narrows of the Los Angeles river" and build a dam down to bed rock across that, a masonry dam tight and high enough to cut all the waters, and then an actual measurement of the waters in a reservoir back of that would give the total run-off, the surface flow, the storm flow and underflow and everything that runs off. That is the basis upon which all of the measurements of run-off have been made that I have made, and on all the data that I have collected has been on that basis. I stated I built the Sweetwater dam, which is founded on bed rock; and it entirely crosses the mouth of the valley. A record has been kept of the amount of run-off at the Sweetwater dam ever since the construction of the dam; it is very possible and easy and simple to keep a perfectly accurate record under those circumstances; it is like measuring water with a tin cup. In the year 1887 and '88, immediately following the completion of the dam, the mean run-off per square mile of watershed was 2.6 miners' inches. In 1888 and '89, the mean run-off was 9.3 miners' inches. In 1889 and '90, the run-off was 14 miners' inches. In 1890 and '91 the run-off was 7.6 miners' inches. In 1891 and '92 the run-off was 2.2 miners' inches. In 1892 and '93 the run-off was 6 miners' inches. In 1893 and '94 892 the run-off was one-half of a miners' inch per square mile. All of these are miners' inches per square mile. The mean value of those amounts is 6 miners' inches per square mile, for a total period of 7 years. We had no means of ascertaining what the mean rainfall really was except by applying some such rule as I have given. The rainfall at the dam was 11.44; the mean rainfall for that period was 8.34 to 23.25 inches. The rainfall at the Cuyamaca dam, which is on the summit of the mountain and near the head of this rainshed, was taken as the extreme and for that period was 41½ inches as the mean. I have not applied Mr. Lippincott's rule, taking the rainfall at the dam, but I can do so in a moment. The elevation of the highest portion of the watershed is about 6,000 feet; the elevation of the dam is about 200 feet. That would be a difference of 5,800 feet in elevation, and, applying Mr. Lippincott's rule of 6.10 increase for each hundred feet, there would be an increase of 34.8 inches; adding the 11.44 at the dam, there appear to have been 46.24 inches as the probable rainfall at the highest point. Taking what the record actually showed, 41½, and the rainfall at the dam of 11 inches, would make 51½, and one-half of that would be the mean rainfall. Owing to the character of the watershed it seemed to me unfair to make such a mean and for purposes of estimating or simply for illustration, I took 20 inches in figures here in book as the probable mean. And the mean run-off of that amount of precipitation actually caught and measured was 6 per cent. If we had taken a mean of 25 inches which the mean of the

two gauging stations, rainfall stations, would have given, it would have been a smaller percentage than 6 per cent. The higher portion of the watershed is quite precipitous, is of a granite formation with considerable undergrowth vegetation upon it. The hill and lower portions are rolling hills and narrow valley, which de-
893 scends with a sandy bed, and there are quite a number of cultivated fields through the watershed. I have some data with reference to the San Gabriel which Mr. Lippincott furnished me. I understand this data is material which he gathered for official report, I think, for the years '94 and '95. I have examined data of his, and have referred to it as a portion of the basis for my own estimates of this shed. I found for the mountain watershed 9,520 inches. And for the foot-hill portion of the watershed a run-off of 1,778.

(To Mr. CHAPMAN:)

That is not what was left after the run-off; that is the run-off.

(To Mr. DUNN:)

The total run-off in the mountain is 9,520; and in the foot-hill, 1,778, and in the valley, 400. Making a total in round numbers of 11,700. I should say it was the character of precipitation that raises the average of the rainfall so much in particular years, which comes in violent storms and in considerable depth. The character of the run-off at that time as to quantity is greater than the run-off that would come after a storm of moderate character, falling gently and spreading over a longer period. A storm, for illustration, at which four inches of rain fell in two days would discharge a much greater storm run-off than a storm in which four inches fell in 8 or 10 days; particularly if the conditions of saturation existed. If the ground were well wet or saturated a larger percentage of rainfall would run off than if it were dry. It is a fact, undoubtedly, that the average rainfall of all this country is very materially raised by a few years of great flood. I should think the years 1884, 1885 and 1889 materially raise the rainfall of this country as estimated for seventeen years back, and raise the average; I don't remember 1885; I remember 1883–'4 and 1889–'90, I think it was, and that was another year of heavy storm. The Newell curve is as accurate expression of probable run-off as I could adopt. As I said before,
894 in every case in which I have compared it with actual measured run-off, the curve gives a greater run-off than the measurement. If there is an error in the curve, in my opinion, it gives a greater run-off than the true run-off, I think, except, possibly, with a year of small rainfall and coming as a violent storm like a cloud-burst. A cloud-burst will be an exception to that rule. Applying that rule to the average rainfall on this watershed for the average year, my figures of 11,698 inches seem to be liberal figures for the run-off, if the rainfall is fairly representative of the truth. It is my impression that they are correct; it is my opinion that they are correct. The method by which I arrived at the probable percentage

of run-off as the normal flow as compared with that of the storm flow, was by observing from these data of measured rainfall the amount flowing at different periods of the year. Now, in the measure- made on the 21 streams of the San Joaquin valley, to which I referred the other day, I noticed in the table of run-off that from 75 to 90 per cent. of the total run-off occurs in—within six months, certain six months, that is, from January to August; and the remaining six months show the normal low-water flow of those streams. Under the conditions existing on this stream, where there are gravel beds that equalize the flow to a considerable extent, I think that, although the percentage of the run-off measured at the foot of the mountains might be as high as 75, 80 or 90 per cent. of the total run-off, within the storm period, the probable run-off below these gravel beds would be fairly represented by 60 per cent. during that period; which leaves 40 per cent., or 4,680 inches, as the normal flow. Of this 4,680 inches, assuming that 2,500 inches flows upon the surface of the Los Angeles river at the east end of the Pomeroy and Hooker land during normal flow there are, in my opinion, about 2,000 inches or 2,180 inches of under-
895 ground flow which passes through the neck of this valley through the Pomeroy land and the valley opposite to the other side. I don't think it is possible to make a diversion of the underflow of the Los Angeles river upon the Pomeroy and Hooker land, without affecting the surface flow, it will diminish it in the neighborhood of the place where the diversion is made. A diversion of the underground waters in the formation of this region would immediately affect the surface flow, or within a short period, because the river would naturally drop through the material composing the bed down to the level of the lower grade. Supposing a tunnel were cut through this land 30 feet below the saturation plane, and parallel to the river, one, two, three, four or five hundred feet from it, and an open tunnel, and the water drained out through that, it would, in my opinion, absorb the river. I made some measurements of the river between the Pomeroy and Hooker land and the cross-section indicated on Exhibit 26, near the Southern Pacific bridge, some years ago, and found a material increase. I think a portion of the waters of the Tejunga are rising all the way along down the river for a few miles below, and other watersheds are contributing to the underflow; the Verdugo, particularly. The underground water of the Tejunga that I speak of as coming in is the water which flows under this same tract and the tract adjoining it. I believe that that water rises to the surface and increases the surface flow. The undergreund flow of the Verdugo, in my opinion, comes in above and below the Crystal springs for quite a distance, all the way along. I have seen the cross-section indicated by this map entitled "Narrows of the Los Angeles river," in court, and have been on the ground. I do not know of my own knowledge what the measurement of the surface flow of the river is at this cross-section at this time. Assum-
896 ing that the flow of the river at this lower cross-section, including the diversions that are made between the Pomeroy

and Hooker land and there, would be four thousand inches, and assuming that the measurements at the east end of the Pomeroy and Hooker land would be 2,500 inches, there would then be an increase of 1,500 inches. If there is an increase of 1,500 inches between those points, I believe that increase comes from the two sources that I have mentioned, the main river flow and the Verdugo; as to the proportions, I have not formed any special judgment in that matter. I have not been able to determine the precise area of the Verdugo watershed as yet. I will do so, however. Assuming that the Verdugo watershed discharges 750 inches of water, in my opinion there would come in of this increase, from the underground flow from the Tejunga, the difference between the 750 and 1,500; assuming that the Verdugo watershed of which you spoke, covers all of the land down to the cross-section. There is no other source of supply of which I have any knowledge, to supply this, excepting that area. It is not all Verdugo watershed. It is part the Verdugo mountain side and part the Cahuenga hillside. As far as I have been able to ascertain from the borings that have been made, it is apparent to my mind that there is a direct connection between the surface and the underflow of the Los Angeles river, through the land in question, and that the river or the surface flow is resting upon and is a part of the underflow. It would not be possible to take out any portion of this underflow below the river without the surface flow falling to make the void good, unless you could make some impervious bottom to the river, which it has not at present. It is, in my opinion, all one stream.

Cross-examination.

By Mr. CHAPMAN:

897 I have seen the excavations made on the Pomeroy and Hooker land. I have been there twice since the excavations were made. I spent the greater portion of the day there each time; saw the wells that were bored there. I don't suppose I examined all the wells that were bored and open when I was there. I examined them over the entire tract ranging from north and south a distance I think of about a mile. I did not go to any other wells in that section of the country that have been bored by other people or dug. In all of them I did visit I found water. The width of the Los Angeles river as it flows on the surface through that land varies from 40 to 100 feet, I should judge. I don't know what the extent of these borings down the river is, but I should judge about a mile and a half, and about a mile, north and south, cross-section. There was water in all the wells that I saw. The upper end of the excavation is a few hundred feet, in distance, I judge, from the surface of the river flow. Three or four hundred feet possibly. I saw the water coming into these excavations all the way along. I know that the waters in the wells stood at a higher elevation than the surface water of the river. It is my opinion that the Los Angeles river and all of that water constitutes one stream, in the sense of their direct connection; there is a direct connection. In those cuts I saw the

water coming from the river side of the cut into the cut just the same as I did from the other. I saw no spaces there without water. I think I saw spaces where there was a vast difference between the amount of water that was found in them and that which was found in other places. There are several places outside of this river, which was from 40 to 100 feet wide where there was an open flowing stream, besides these cuts; adjacent to the river on the north side, I remember; on this map marked Exhibit 14, I think it is—Plaintiff's Ex-
898 hibit 14. The point marked "Tejunga creek," where there is a stream coming into the river. That is near the upper cut, at a point on block 67 there is a stream away from the river a hundred feet that is running into the river. The overflow waters from the Pirtle ditch I believe come in at that point. But there are waters coming in from the bank all the way along above where those waters come down, as well as below. I think the Pirtle development comes in there, too. On block 69, and in various other points along down the stream there are other fine streams coming into that. I don't know of any local names to them. They are all the drainage of the Tejunga creek, in my opinion. They are not flowing in artificial ditches; they are natural cuts; I judge they are half a dozen of them or so. They are on the surface of the ground and emptying into the Los Angeles river, otherwise they wouldn't be visible if they were on the surface. They have come from underneath the surface, however. The Los Angeles river is made up of accessions of that character all the way along. Water is generally found in the soil on either side of all streams; and those waters will connect, also, with the waters of the stream, generally. The Los Angeles river has its peculiarities. It is not quite like every other river that I have been familiar with. It is similar to almost all streams that run first on the surface and then under ground, and then rising again to the surface. The Los Angeles river does that in the valley above these lands. I have been at the head of all the tributaries of the river. I have been at the place where the water of the Los Angeles river appears above ground above the Pomeroy and Hooker tract in the San Fernando valley; I was there the first time in 1879. I don't remember how far that is from the Pomeroy and Hooker tract; I think it is a mile or two. I have never measured the water at the point where it
899 first appears. That particular stream does not disappear. When I spoke of the di-appearance of the stream I had in mind the fact that the true Los Angeles river—what is the Los Angeles river is the Tejunga branch; that, in my mind, constitutes the Los Angeles river. If the river had been named by an American instead of a Mexican he would have called that all one name from the sea up to the head of the main tributary, similar to the San Gabriel, which is called the West fork and the North fork and the East fork of the San Gabriel river. The Tejunga I consider the main Los Angeles river. It furnished a very large percentage of all the water of the stream, and should be regarded as the main stream itself. I was at the headwaters of the Tejunga in the year 1880. I travelled up the Tejunga canyon when I went there. I

don't think I went entirely to the summit. I made no accurate measurement of the water of the Tejunga. I think I made an estimate of the amount that was there, at different points along the way. I have not my notes of that reconnaissance. And it is a good while ago and I can't remember. I cannot remember what my estimate was as to the quantity in that stream at any point in the canyon. The canyon is quite precipitous and narrow, rocky, partially wooded with small undergrowth; partly covered with vegetation, but in places quite bold cliffs of bare rocks. There is a good deal of this character of ground in the watershed. I think there are falls in the canyon. I don't remember that I went above the falls. My recollection is that I went to the falls. I don't know about what the height of the falls was that I visited; it is my impression that they were in the neighborhood of a hundred feet. I have not been up in the Tejunga canyon since I have been employed by the city with reference to this case. I have been at the headwaters of the Pocoima, that was at the same time; I went up on horseback
900 as far as I could, and walked up a little ways. My recollection is that I went up the canyon. That was also a precipitous canyon of about the same general character as the Tejunga; that is my recollection. I don't recollect any measurement of the waters of the Pocoima. Any recollection that I have in my mind now of the quantity of water that was flowing there would be very vague. I would not venture to give any expression of a reco-lection of the quantities. I don't recollect how far the mouths of the two canyons are apart. (Refers to map). About five miles. The waters from all that watershed, I say, come out upon those plains, whatever is not lost in the mountains by evaporation and plant life. The proportion of the loss by evaporation and plant life in that mountain range, before the waters descend upon the plains, varies with the amount of precipitation. If the precipitation is very small it is mostly used up in evaporation. After rain storm in this country I have noticed that we generally have a north wind that licks up a great deal of the precipitation.

Q. Well, what percentage of the average rainfall as computed by you do you think is lost in evaporation and plant life on those mountain ranges before the water comes into the plains?

A. The percentage shown by the Newell curve which I used in my calculation would be about 50 per cent. for the mean area—I mean the precipitation that I used.

Witness resumes: The Newell curve is a diagram which expresses the relation between the mean annual precipitation and mean annual run-off. It is an expression of the relation existing between those—as I have said of the rainfall and the run-off at different quantities. The diagram takes the form — a curve, curved line, which starts with zero, representing no run-off and no precipitation. That is the zero or starting point of the curve.

The data from which it is made was obtained by the
901 Geological Survey, the hydrographic branch of the Geological Survey, under the direction of Mr. F. H Newell, and was the result of the gaugings of a number of rivers and streams of the arid

region and comparing their volume with the known area of the watershed and the known rainfall, average rainfall. I have told you that the Newell curve is the expression of the relation of the mean rainfall to the run-off. The relation is expressed on the curve. It appears to have more the form of a parabola than any other form. But to explain to you about how it is plotted, for instance, a certain watershed would have been found to yield a volume of water equivalent to five inches of rainfall, with 17 inches of precipitation on mountainous areas; another might have been found to yield, for instance, 10.5 inches average rainfall or run-off over the whole watershed, with an average rainfall over that shed of 24 inches, and in that manner various points have been located from actual observation, and a line supposed to be an intermediate between those observations has been drawn, which expresses in a general way the relation between those ideas. The relation varies with every particular case. In this case I have used the Newell curve although actual experience in the measurement of the run-off of those watersheds and the rainfall would indicate a less amount of run-off. I used the Newell curve as a guide for computation about this San Fernando basin. Taking the mountainous area which I—by the method of arriving at the mean precipitation which I have already explained to you, I determined to be 27½ inches, and found by the curve that a mean average run-off for that character of area would be about 14½ inches in depth. The Newell curve would express something to any depth of rainfall that you wished to apply it. If you had asked me for the run-off as expressed by the Newell curve for any particular depth of rainfall I could have given it to you. The Newell curve expresses for any depth of rainfall the probable run-off for that depth of rainfall on areas of different characters. There are two lines on the curve, one representing the probable run-off on the mountainous areas, and the other on plains or undulating areas. The climate undoubtedly has something to do with the calculation from which the Newell curve has given its expression. These observations from which this supposed expression of the relation resulted, were made throughout the West. The Geological Survey has extended in its observations of the flow of streams throughout California and Nevada, Arizona, Utah, Colorado, New Mexico and other portions of the arid West where irrigation is required. I notice that the only points that are given on the Newell curve referring to any particular stream are eastern rivers. Take the Potomac, Connecticut and Savannah rivers. The rainfall of those rivers has been measured, and there are three points on the curve representing the run-off from those rivers. Those are the only ones which are noted on the curve. It was in the West that those observations were made as I understand it. I think that an active mathematician might be able to express some formula for working out that curve. But it is not necessary that it should be expressed mathematically, as it is expressed graphically in the diagram, which is of simple use. I don't know whether they took into consideration the percolating waters, in the observations on the Potomac and the Savannah river, and other eastern rivers, from which this Newell curve was

902

deduced. In making the application of the Newell curve to this section of the country, and arriving at an opinion from that application that there was so much run-off I have included within the term "run-off" everything that would be caught by a dam at the lower end of the watershed, whether it be sur-
903 face flow or underflow. The lower end of the watershed in any case, would be at the point selected for the location of such a dam. In this particular case we might select such a position at the city of Los Angeles, or at any point above; I say I would select such a place to make that application. I don't say that a dam could be erected to catch and impound the water of the watershed. A dam might be erected and a weir placed for the measurement of the water flowing. The point at which such a dam could be located to arrest the waters of this particular watershed is at the lower end of the particular watershed; that point is the lower end of the lands in question. In computing the run-off from the portion of the watershed above the lower end of these lands, I did not take into consideration any waters that would come into the Los Angeles river or percolate into the lands adjoining it, below the lower end of the land in controversy. I have an idea of what the watershed of the Los Angeles river is. In applying my Newell curve proposition to determine the percentage of run-off, yesterday, I included within the run-off all the water that flows off; anything that reaches the river and forms a part of the river, and ultimately runs off, is run-off. Nobody knows what reaches the river; but one can make an estimate of what, in their opinion, reaches the river. I made that estimate yesterday as being a certain proportion of the rainfall on the watershed. It certainly makes a difference in the determination of the percentage of run-off, as to whether that water reaches a stream, or whether it is absorbed by evaporation and plant life. It would make a difference in that respect as to whether it is run-off or is not. Given a certain percentage of it that is run-off. That run-off is not determined, I think, nor affected by the quantity of water which goes into the Los Angeles river or goes somewhere else, except that the greater percentage of all the water that runs off
904 must ultimately reach a stream and run off. But if my opinion were otherwise as to where it reaches, that still would not at all affect the calculation as to the amount of run-off. In my calculations yesterday as to the percentage of run-off, I was including everything that is embraced in the rainfall, except that which is consumed by plant life and evaporation, for the whole watershed. I mark as the place for determining the percentage of run-off, a point at the boundary line between one class of watershed and another class. The run-off from the mountain shed is determined at the point that divides it from the foot-hill class. The foot-hill class at the point that divides it from the valley lands or rolling plains. And then the rolling plains constitute another class by themselves. The Sweetwater dam is located about 7 miles from the city of San Diego, up the stream, on the Sweetwater river, east from the bay of San Diego, and the top of the dam is 215 feet above the bay, and the bottom about 140. It is about 40 miles from the extreme east-

ern end of the watershed—186 miles of watershed area; that would be about 4½ miles in breadth by 40 in length of the watershed. The mountains that constitute this eastern end of the watershed, lie about parallel with the Pacific coast line; and along in that section the trend there of the coast line is about southeast and northwest. The watershed is about 40 miles in length from northweste-ly to southeasterly, and about 4½ in breadth; it may average that. It may be wider in some places and narrower in others. The Sweetwater dam, with reference to this length of 40 miles, is at the southwestern extremity. There is only one stream whose waters are intercepted by this dam. The country in this watershed, for the first 20 miles from the dam up, is a rolling country whose slopes are partially cultivated, with a narrow valley from a quarter to half a mile in width between the hills and occasionally
905 canyons between the valleys. The upper portion of the watershed is of a precipitous granite formation. I don't know that one-half of it would represent the area that is partially cultivated, but I am inclined to think that it might be divided in about that way. I think about one-half of the distance. There are farms all along the valley portion of the watershed, and scattering farms on the slopes; I haven't any idea of the area. I think the amount under cultivation would exceed a thousand acres several times; I have no very definite information on the subject, but I should judge that the cultivation would exceed 5,000 acres. I haven't made an estimate of the area of the foot-hill or rolling plains portion of this watershed above the Sweetwater dam. I took the measurements of the rainfall at the dam, and I have the record of the measurements at the Sweetwater dam of the rainfall at that place. I did not have any records of the rainfall in the higher elevations immediately on the watershed, but adjacent to it. The highest peaks of the mountains that constitute that watershed run up to an elevation of about 6,000 feet. The average elevation of the watershed is in the neighborhood of 2,800 or 3,000 feet, I should judge. In making the calculation of which I spoke yesterday, I assumed 20 inches as possibly a fair mean for the rainfall upon the mountain watershed. This watershed begins at the dam, which is seven miles from the bay and continues about 40 miles, from the dam. I think it is, from the farthest point of this watershed to the seacoast on a straight line, in the neighborhood of 35 to 40 miles. The average of the rainfall at the Sweetwater dam is 11.44 inches; I don't know what it was for '94 and '95. I obtained the figures for the years that I did give from the original records, from time to time during the past; I think the last time that I got the memorandum from which this was taken was about two years ago. The original record was kept by a man
906 by the name of Fred Fulton. The waters that is impounded by the Sweetwater dam is distributed over the orchard lands of Chulavista and National City. The cultivation there is some 4,000 acres. The Chulavista lands are upon a mesa which rises from the bay to an elevation of about 100 feet, gently sloping from the bay up. The National City lands are similar, but somewhat

broken by ravines that traverse the mesa. That is one of the countries which I have studied, and the information derived from that study is in part the foundations of my opinion with respect to this San Fernando basin. There are other section- of southern California that I have made a study of—the watersheds of the Mojave river, which are being measured by the Arrowhead Reservoir Company. The section of country on the Mojave is somewhat similar in its general composition and topography to the Sweetwater country; they are both granitic in formation; the Mojave, however, faces north. The Sweetwater watershed faces south and southeast. I don't know of any gravel beds to any great extent on the Arrowhead watersheds above the point where the measurements were made. The Sweetwater had some sand and gravel beds extending a few miles—I should think about 10 or 15 miles in length altogether, by a width of about a quarter of a mile. I have been generally familiar with all of southern California. I don't recall any particular localities upon which I have any exact data as to measurement of run-off and rainfall, other than the Mojave country and the Sweetwater. I think it was some time in 1890 I made a report upon the sources of the Arroyo Seco, and the quantity of water. I made a study of the section before I made a report. I don't remember now what basis I adopted for my determination of the rainfall in that watershed. I think that I may have used an arbitrary rule that was derived from my best experience up to that date, for the determination of
907 the amount of run-off in that watershed. I don't know that my experience since that date has modified my ideas of that particular watershed. I think it has of the watersheds of southern California generally. I don't know that this Arroyo Seco watershed calls for the application of any different rules from any other watershed of the same general description and character. The area of the watershed of the Arroyo Seco was figured at that time at a hundred square miles. At that time there were no exact measurements—surveys available for the computation of the area of the watershed. The watershed map of southern California had not been completed in the State engineer's office at that time. And the estimate was made up from the observation of Mr. Purcell and myself in the watershed as to its probable area. The maps have been completed since that time. The watershed of the Arroyo Seco, I believe, is about 40 square miles, instead of a hundred. I don't remember now what the rainfall was that I adopted as the average. I haven't seen the report for a good many years. I was acting with Mr. Purcell, for the La Sierra Water Company—I think that was the name of the company. I knew that they were then contemplating the appropriation of the surplus waters of the Arroyo Seco, and the construction of works for the conduct and distribution of those waters to various sections of this country, and especially Los Angeles city. My recollection of my relations to the company is that I was called to consult with Mr. Purcell as to the general proposition; and, as I was not employed to personally measure and investigate either the watershed areas or the precipitation, I

accepted those which were furnished me, as the basis of my calculations. If you have a copy of the report, I have no doubt that the language of it is: "That I had gone over the ground with the chief engineer, Mr. Purcell, and had agreed with him as to the general lines of investigation which he
908 had prosecuted with painstaking and intelligent care." I thought I had gone over it with him sufficiently to know whether he had made an intelligent and painstaking investigation, for the purpose of giving the information which was required. In topography this Arroyo Seco country is quite similar to the mountain section of the Los Angeles river, although it is more directly presented towards the prevailing direction of the saturated wind currents from the ocean. I haven't made the computation, and I don't know what the proportion of the foot-hill section to the mountain watershed of the Arroyo Seco is, as compared with the foot-hill portion of the Los Angeles River watershed to the mountainous part of it. I don't recollect whether I made any computation as to the proportion of the rolling plains of that section to the foot-hills and to the mountain watershed. I don't think I did. If Mr. Purcell had made a classification of the different parts of that country, I would have no doubt reviewed it. I don't recollect anything of the report to the La Sierra Water Company, as I haven't read it for a great number of years.

Q. I will read you, Mr. Schuyler, a portion of what purports to be your report, and give it to you to verify and see whether I am reading it correctly. "Now, as to the engineering features of the work you have projected. I have gone over the ground with your chief engineer, Mr. Purcell, and have agreed with him as to the general lines of investigation, which he has prosecuted with painstaking and intelligent care. I am satisfied that there are no serious engineering difficulties. You have appropriated the surplus waters of the Arroyo Seco, or those unused or unappropriated for any other purpose. Mr. Purcell has shown by his report that the stream yields an average flow of 52,000,000,000 gallons per annum, of which you may safely say that 80 per cent., or 41,600,000,000 flows off in the period form December first to May first. I believe
909 his estimate of the area of the watershed, the average annual rainfall, and the percentage of rainfall drained off, are all sufficiently conservative. The nature of the watershed is such that, to ascertain correctly its area would involve a very difficult and costly survey, which is entirely unnecessary for you to undertake, because of the certainty that the surplus waters are in every season far in excess of your capacity to utilize and store them, and greatly in excess, too, of the requirements of the city for all present and probable future needs. The proposition of storage of water during the period of abundance for use the remainder of the year, or for even two or three years' supply, is one whose feasibility is demonstrated all over the globe. In this State, San Francisco and Oakland may be taken as most prominent illustrations of water supply obtained by this means. In this case the water is not stored in the bed of the stream which supplied it, but is carried some four miles

to an adjacent basin, where a reservoir is to be formed by building a high dam. There is every advantage in this method for the volume admitted to the reservoir is subject to perfect control, and there can be no disaster produced by overflow, which is the cause of the great majority of dam failures. The nature of the conduits admit of no doubt of its feasibility. In all doubtful ground it passes through tunnels in the face of the canyon wall, which are far enough in to reach solid rock and perfect security. The long inverted syphon, where the maximum pressure on the pipe is about 95 pounds per square inch for a short distance, presents no formidable or unusual features. To reach the storage basin, the conduit ends with a tunnel, 2,200 feet in length, through a sharp ridge where surface indications show that it is composed of granite, and is doubtless firm enough to require no timbering or arching. In order to perfect your title to the appropriation of as much of the flood waters of the
910 Arroyo Seco as you ever wish to handle, as well as to control everything that comes in the short freshets of dry years, I think your conduit should be proportioned to carry 20,000 miners' inches; 400 cubic feet per second. With the grade of 20 feet per mile, which you can give it, 8 feet wide, a cement-plastered tunnel 6 x 8 feet, or four pipe lines of 4 feet in diameter each." Do you remember it? Do you wish to look at it? (Handing document to the witness.)

A. I remember that, yes, sir.

Witness resumes: That is the way I reported. In that quotation I recognize a percentage of run-off within the storm period of 80 per cent., which confirms the testimony that I gave yesterday on that subject. I had forgotten the data of this report, as I had not referred to it for several years. The 80 per cent. of the total run-off runs off during a storm period of a few months.

Mr. DUNN: Did you offer that in evidence Mr. Chapman?

Mr. CHAPMAN: I have read it.

Witness resumes: I have read that report. What I refer to there by "Mr. Purcell has shown by his report," is, I think the report of Mr. Purcell contained in this same pamphlet. I have not looked at that report of Mr. Purcell recently. (Witness referred to pages 13 to 15 of document.) That is the report to which I referred.

Q. The report of Mr. Purcell, to which you referred then in your own report, contains this passage, does it not: "Watershed. As the mountains through which this stream flows have not yet been surveyed, no information as to the extent of the watershed is obtainable in the United States Government Land Office. However, by careful inspection and calculations as to the positions of the streams lying on the other sides of the divides, I hold that a very conservative estimate will give an area of five square miles per mile of length, or, in all, 100 square miles. It is but fair to mention
911 that those most familiar with the locality estimate the average width of the shed at 8 miles; which will give a watershed of 160 square miles. I have deemed it best, notwithstanding, to make my estimates on the former figure: "Rainfall. Govern-

ment statistics show the average rainfall of Los Angeles county to be 17.44 inches, and a personal residence of ten years confirms that. All of this rain falls during five of the winter months; and it is your intention to conduct off these waters during these five months, and retain enough by deep reservoir storage to maintain the necessary supply to fill the city's demands, both now and in the future, with a large reserve left over. Precipitation by seasons: 1878 and '79, 11.35; 1879–'80, 20.24; 1880–'81, 13.13; '81 and '2, 10.40; '82–'3, 12.11; '83–'4, 38.22; 1884–'5, 9.25; 1885–'6, 22.58; '86 and '7, 13.76; '87 and '8, 14.01; '88 and '9, 19.25; 1889–'90, 34.84; average for 12 years, 17.44 inches. A rainfall of 17.44 inches as computed by the Government observers, does not truly represent the rainfall over this watershed, the observations being taken on the plain of Los Angeles city. The watershed, owing to its topographical position, facing, as it does, the wet trade winds blowing from the Pacific ocean, and from its elevation, from 1,700 to 5,600 feet above the sea, it condenses the rain clouds earlier and also later in the season than the valley. By comparison of rain gauge kept nearer the mountains, the best observations indicate an increased fall of over 70 per cent. of that of the valley record. This makes 30 inches of rain in these mountains for an average. An inch of rainfall will give 2,323,200 cubic feet per square mile; and equating, we find: Quantity of average rainfall of the entire watershed equals 2,323,200, multiplied by 100, multiplied by 30, equals 6,969,600,000 cubic feet. Or, in round numbers, fifty-two and one-quarter billion gallons average rainfall in five months.

912 Making due allowance for evaporation, absorption and percolation, you may calculate on having available for storage twenty-six billion gallons of water per annum. Now, taking the present population of Los Angeles at 60,000 and allowing 100 gallons per day for each person, this amounts to six million gallons daily consumption, or 2,190,000,000 gallons per annum." And so on. That is all that relates to the rainfall. Now, that is the report of Mr. Purcell to which you referred in your own report, isn't it?

A. Yes, sir.

Witness resumes: That reservoir that the La Sierra people were talking of constructing, was to be located in the Aliso canyon, I think, was the name of the place. That is a little east of north of the city of Los Angeles, about ten miles, I think, on the west side of the Arroyo Seco. The Aliso canyon does not empty into the Arroyo Seco; it empties into the Los Angeles river. It comes the other way. We were to get to this reservoir by means of a tunnel, I suppose. I don't recollect the length of the tunnel; it is the same tunnel that I speak of in my report. The immediate topography of the Arroyo Seco watershed above this tunnel, is that of the Verdugo hills, and following up the Arroyo Seco a little further, we come to the Canyada valley, between the Verdugo hills and the mountains. I don't recollect how far it is across the Canyada plains there to the base of the mountains; I think about two miles. The Canyada is pretty abrupt; quite steep; and about two miles you come to the base of the mountains. The character of the

mountains is very precipitous; they rise to an elevation of about 6,000 feet. In making the computations that I have delivered here to the jury, concerning this San Fernando basin, I didn't refer to my figures on that investigation of that section at all, I don't think. I said I had platted on the Newell curve the results of actual measurements of about 40 different watersheds,
913 but this was not one of them. I read Mr. Newell's own description of his curve, and wishing to form a judgment as to its probable accuracy, I applied to it all the collateral data which I could gather, and platted upon that curve a number of points of actual measured rainfall and run-off, to test its probable accuracy. As I testified yesterday every point that I have located was below the Newell curve, showing that the Newell curve would give rather in excess of actual experience in this country, if used.

Q. Did not Mr. Newell say of the curve that "as a broad statement it may be said that run-off is the function of rainfall and topography, with modifications introduced by various other conditions, such as climate, geological structure and vegetation. Therefore, the maps showing only depth of run-off and of rainfall, cannot be expected to coincide, especially where there is great diversity in topography. It is possible, however, with the limited data available, to make broad approximations of quantity of run-off corresponding to certain depths of rain; or, to put the matter in another form, it is possible to use the run-off map to show percentages of rainfall which gathers in streams. For example, where the depth of run-off is from 0 to 2 inches, it is apparent from data that less than 10 per cent. of the rainfall appears in the streams as run-off. Where the run-off is from 2 to 5 inches in depth, this relation is from 10 to 25 per cent.; where from 5 to 10 inches, the relation is from 40 to 50 per cent., and where the run-off is 20 inches and over in depth, this represents generally over 50 per cent. of the rainfall."

Mr. DUNN: We will admit Mr. Newell said that, to save that difficulty.

A. I think so, yes.

Witness resumes: The Cuyamaca country in San Diego county that I referred to yesterday, is at the headwaters of the San Diego river, which is the adjacent watershed to that of the Sweet-
914 water river. I recollect that Mr. Dunn asked me what would be the amount of rainfall applying that rule, the amount of rainfall on the Cuyamaca watershed, or at the upper end of the Sweetwater watershed, if this rule were applied; and I made the estimate on the stand. My recollection is that the application of the rule showed a slight variation of the Cuyamaca watershed. The figures that I made yesterday, applying the rate of increase to an elevation of 6,000 feet as the extreme—now in explanation of that, I should say right here that while the highest points of the watershed are about 6,000 feet, the points where the rain gauge was kept of the Cuyamaca was about 4,800 feet. That was at the dam. And that if the difference between the elevation of the Sweetwater dam

and the Cuyamaca dam were to be taken as the difference upon which to apply this rule, the result would coincide very closely with the actual measured rainfall at Cuyamaca dam. The result of the application of the Lippincott rule would coincide very closely. I was in error yesterday in applying it to a higher elevation than that where the actual rainfall was measured. I applied it to the extreme height of the watershed, where there is no record of precipitation, when it should have been applied to the actual elevation where the record was kept. The average rainfall at the Cuyamaca dam for the period of which I have a memorandum, 1887 and '8 to 1893 and '4, was 41½ inches; there are 7 years; 7 seasons. During those same years the average at the Sweetwater dam was 11.44 inches. The difference in elevation between the Sweetwater dam and the Cuyamaca dam is about 4,600 feet. I don't recollect whether I made a report to a man by the name of Savage with reference to the average rainfall upon the watershed of the Sweetwater dam.

915 Q. Do you remember of making a report to any one connected with the enterprise of constructing this Sweetwater dam concerning the average rainfall by which it was to be supplied?

(Objected to.)

Mr. CHAPMAN: As we are informed it is a report furnished about two years ago, as I understand it, to a Mr. Savage, in which Mr. Schuyler, after considering all of the features and record of rainfall, reported the average rainfall of the Sweetwater mountain shed at 24.483.

The COURT: Why don't you ask that question?

By Mr. DUNN:

Q. Mr. Schuyler, did you ever make such a report?

A. I made a report about two years ago of such a nature; I didn't recollect that I had reported as to the average rainfall, however, in that. It was a report in which the advisability of the raising of the Sweetwater dam was in question.

Witness resumes: I think I have a copy of the report at home, but not at my office.

(To Mr. CHAPMAN:)

I don't recollect making any such figures of the mean rainfall at the Sweetwater and Cuyamaca dams for the seasons of 1887 and '8, down to and inclusive of that of 1893 and '94, although I may have done so. I have always preferred to use actual measured results to any estimate on probable mean rainfall, taking various records of points widely removed as the mean. I also took the actual measured results of the shed, in that report, I recollect. My measured results were the measured results of the water that flowed past the Sweetwater dam. It was of little interest to know what the rainfall was; we knew what the watershed was and what we could catch of it. That was the most interesting feature, for that particular enterprise. If we only got so many inches, that showed the capacity of the watershed to yield water.

(To the COURT:)

The principle question that interested us at that time, was
916 how much was consumed in plant life and evaporation, and how much we could depend upon for reservoir purposes.

(To Mr. CHAPMAN:)

I said the principal thing was, how much was consumed in evaporation and plant life, and what we got at the reservoir. The only important feature of the financial problem was how much water we got there; it was a matter simply of scientific interest to know that the loss by evaporation was an excessive one. And for the purpose of determining the percentage of the water of the whole rainfall that we got at the dam, it would be necessary to know what the average rainfall was. My recollection of the purpose of that report was to be able to estimate from the rainfall record at San Diego for a number of years back, what the possible yield of that watershed would have been had the dam been constructed 20 or 30 years ago, or as long back as the record extends, and to determine as to whether a dam of greater height would have been supplied, taking one season with another. For that reason, in the absence of any longer record it was necessary to make some application or to establish some probable relation between the rainfall at San Diego, which was the only record available, and probable run-off at the Sweetwater reservoir. That was a rough approximation of the way to get at what would have occurred in the past had the dam been constructed. We had no records of the rainfall extending back over a period long enough for our purposes except at the city of San Diego. We did have the record for several years back at the dam and at Cuyamaca.

Mr. DUNN: I see Mr. Lippincott in the room. It will save some trouble to the sheriff. Mr. Lippincott is retained by the other side in the matter, and will not testify to a matter which I want unless subpœnaed. I will pay the fee, if necessary, and I will ask the court to instruct Mr. Lippincott to return at two o'clock.

917 Mr. VARIEL: I object to the remarks of the gentleman and I wish to take an exception.

Witness resumes: I have not made any direct experiments for the purpose of determining the velocity of water percolating through gravel bed in this section of the country. I made an estimate of the probable underflow of Lytle creek some years ago. I think I did make an estimate of the velocity of the waters of the underflow.

Q. What was the estimate?

Mr. DUNN: We would like to object again. In the direct examination no such question was entered into.

The COURT: I don't see how it is material or proper. If you are going to compare Lytle creek with the Los Angeles river, you have got to compare it with all its conditions, whether the same grade same material, same head and same width and depth, and every

thing else has got to be taken into consideration; and if they are not similar there is no comparison to be made at all.

Mr. CHAPMAN: I was going to ask him what the conditions were where he made this estimate. (Last question read by reporter.)

The COURT: You are asking for the result first and getting the conditions afterwards. You had better see whether there is any similarity, anything that makes it pertinent to the case, first. I will sustain the objection to it as it is.

Mr. CHAPMAN: Exception.

Witness resumes: The canyon of Lytle creek is a precipitous canyon, heading at an elevation of some 10,000 feet above sea level, and having a grade of some 300 feet to the mile, with a large mass of coarse boulders and gravel in its canyon bed, filling it to an unknown depth. My recollection is that the grade at the point where I made this estimate was about 300 feet to the mile; it may have been 250 possibly; from 250 to 300 feet per mile, at the
918 place where I made the estimate. The material at that place was coarse gravel boulders—cobbles.

Redirect examination.

By Mr. DUNN:

I said I had obtained a very considerable amount of data in the San Joaquin valley regarding run-off, in my examination yesterday. The results were obtained beginning November 1st, 1878, and ending October 31st, 1884, a period of six years. I have made three investigations in Colorado as to the run-off of streams. The Platt river above Denver; the Clear creek above Golden City, and the Cache la Poudre river above the mouth of the canyon. I have made an examination during the past few years particularly of underflow in western streams; that is a subject on which I have made considerable investigation and taken a good deal of interest. The report which has been read to me on the Arroyo Seco was for a water system which would catch the storm water as well as the normal flow, and was a reservoir system to catch that amount of run-off. If a tunnel along the northern line of the property sought to be condemned were driven down into the water plane 20 or 30 feet, following the north line, on the land north of it, the effect would be to drain Los Angeles river almost entirely. Supposing a system of underground tunnels for the diversion of water was constructed upon this land, the effect of a tunnel parallel with the north line of this land and the west line, and to the depth which you have suggested, would be to deprive that system of water supply of water almost entirely.

(To the COURT:)

Suppose that a system of tunnels was constructed on this land of a capacity to obtain 3,000 inches of water, miners' inches, in my opinion, it would drain the river so that there would be no
919 water upon the surface, practically. If this tunnel were placed between the river and the source of supply on the

north and across the drainage of the Tejunga [which would be the position as indicated on the map, it would have that effect of intercepting the waters which now come to the river, and carrying them off.

(To Mr. DUNN:)

I don't recollect having been asked any question yesterday as to the manner in which this water flowed, whether the water flowed in a solid shape, or whether it flowed more rapidly in one place than another. I think that the processes of nature have continued from all time as they are observable today; that the streams as issuing from the canyons have gradually built themselves up by the accumulation of detritus, debris, that has been brought down and that in years of excessive flood, certain channels have been filled and occupied, then have subsequently—I mean to say certain channels would be filled and new channels formed, and so the process of building up has continued to an indefinite depth. We observe that on the surface channels the greatest velocity is in the center of the channel, and the coarsest material is in the center of the flood channels. As the streams diminish in size they occupy there—the central portion of the flood channel, and the sides of these channels where the velocity is least, is less, becomes silted up with finer material which cannot be carried with the lesser velocity. I think if we could lift off, leaf by leaf the formation of this valley, we would find the channels underneath the ground occupy approximately the positions of the channels on the surface, intercepting and connecting one with the other, but distinct channels where water will flow with greater rapidity than at any other portion of the adjacent country. That is my idea of the flow of this stream.

Recross-examination.

By Mr. CHAPMAN:

920 When I say that a tunnel under there that would develop 3,000 inches of water would drain the river, or practically, in my judgment, I do not mean simply that that would be the effect because I think there's only a limited quantity of water there; I think that would be the effect because it would intercept the underflow of the stream, to the depth to which the saturation plane was cut. I think it would have a direct effect on the Los Angeles river, because the surface flow of the river is less than 3,000 inches. This tunnel intercepting the direct course of the channels supplying the Los Angeles river, would first affect that portion of the water which now reaches the Los Angeles river, and prevent it from reaching the river. I have been to the river on that land, and to the excavations. I know that the water, both in the river and the excavations, is coming up in the bottom as well as through the sides. I know that the water stands higher between the cut and the river than it does in either the cut or the river. I think the reason that the water has a tendency to come up into the river and into the cuts, at present, is due to the fact that there is an

abrupt change of grade on the river at this point, and the finer materials brought down by the stream have been deposited below this point, grading off finer and finer as you come down the stream, and that there is greater difficulty in the water passing through these finer materials—greater resistance, and on account of the fact that water always makes for itself a head, where greater resistance is encountered. It naturally rises to form that head to force its way along. That brings the water to the surface and gives the phenomenon of water rising upward through the strata at this point, we relieve this present resistance of the finer material below, cut the saturation plane to a great depth, and interfere with that tendency; interrupt that tendency. The water then has a direct outlet. It's afforded an artificial out-
921 let and has no necessity for rising to get a head to force itself along.

Q. Well now, let me put the hypothetical case again, and I wish you would give me a direct answer; because I don't see that there is any difference between us about the causes. There are in round numbers 2,000 inches of water at the lower end of this tract. Now, let us suppose the tunnel with 3,000 more development. That's 5,000. Now if there are 10,000 coming down through this soil, percolating through the land, what would become of the other 5,000 inches, would it not meet exactly this same greater resistance that now raises a portion of the 10,000 to the surface, and be itself, raised to the surface?

A. As I understand you, that you assume that a portion of this was intercepted by a tunnel.

Q. Yes sir, I say intercept—we have got 2,000 taken by the river before there is any excavation. The water rises up and keeps that supply. Now, if there are another 2,000 inches developed I would agree with you perfectly, if the 4,000 empties the supply, that that ends the question. But suppose that when we get the 3,000 more, making 5, there are still 5,000 more inches coming right through this same place; that formerly, before the construction of the tunnel, you had 8,000 that was going off to the east through this period here of greater resistance, but which becomes a lesser resistance after you have lifted up the amount of the river. Now, isn't the same true of the cut; that the surface that remained would meet with the same resistance which the underflow meets with before the cut?

A. If it were up to the same level and passing through the same stratum; if the under strata were not coarser and did not afford more ready means of drainage, that would be the case.

Q. Now, Mr. Schuyler, if these conditions by which you
922 exclude this theory happened to exist, wouldn't the result be that there would simply be more than 3,000 that would come into the excavation? (Question read for the witness.) Let me ask it a little plainer, if that isn't plain. If you should cut into this ground with a tunnel through such material, or having such an effect upon the waters that it can come into the tunnel easier than it can go off to the east it will keep on coming into it until its utmost capacity would be reached, wouldn't it.

A. Yes sir.

Q. No matter whether that was 3,000 or 10,000, if the 10,000 is there. So, in the case that I have supposed—if we exclude the water from coming into this tunnel beyond the 3,000 inches, then it will take the course which I indicated before; that is, it will rise by the same reason exactly that it rises before the tunnel was cut.

A. If the tunnel doesn't afford sufficient relief to take all the water that is seeking to rise?

Q. Yes.

A. Yes, on the assumption that there is some water seeking to rise, that would be the case.

Witness resumes: I think that cutting another tunnel on the north side of the river at the same depth would have an effect upon the first tunnel cut, and upon the river, because all of the borings and investigations show that the water is coming from the direction at right angles to the direction of the tunnel, and that the tunnel as assumed to be projected, would be between the water as it was coming from the mountains and the other tunnel that you mention. The water originally is coming from the north towards the south, to this range of mountains on the south; then it turns to the east. If you were to go on the north side of the river, after the waters are deflected to the east, and cut your tunnel, if it was as long as your first tunnel or longer, as I understand you assume the position of the first tunnel to be, it would intercept the course of the waters coming to that tun-
923 nel. I know approximately the depth of the borings that have been made upon this land; my recollection is that they were 25 to 40 feet in depth. I know that some of them were nearly 200. I think that any tunnel on the north side of the river would certainly have an effect upon any other tunnel south of it. The tunnel to the north of it might be started lower down and driven to a greater depth, if any one chose to do so; and the greater the depth that the tunnel was placed, the more certain it would be to intercept water coming down the stream. If you were to run it 75 feet deep and it carried off 3,000 inches of water, and it and the river and the other tunnel were carrying 8,000, and the supply was 10,000, the supply might be going through some channel that would convey it off without——

The COURT: You mean the supply is 10,000 inches, above the level of the lowest tunnel?

Mr. CHAPMAN: Yes sir. I mean that the source of supply from which they all derive it, whether it has gone down to a depth of a hundred feet or 200, and wells up from the bottom into those tunnels and into the river; and that the total capacity of the river and the tunnels is 8,000 inches but the supply is 10,000. Now, what I ask is, not to introduce some other subterranean passage, because that's adding another condition.

The COURT: Well, you have got to assume in addition to that that that whole 10,000 inches flows into the land above the lowest point of the tunnel, because there might be 5,000 of it flowing down

below that and you couldn't get it if you run a million inches of water.

Mr. CHAPMAN: The very proposition I am getting at is that that 5,000 that is flowing down there would come up to the surface, on account of the pressure that is above there, on exactly the same principle that the water which comes down there does come. (Discussion.)

924 Witness resumes: I think that the probabilities are that that water would rise to the surface now if it were there.

(To the COURT:)

If all that 10,000 inches had to rise to the level of the lowest one of these tunnels that have been mentioned, before it could go away down below, under the present conditions of affairs, the result would be to greatly increase the surface flow of the river. (Discussion.)

J. B. LIPPINCOTT, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I have been qualified, and have testified that I have done considerable work for the Government in this locality, and also practiced my profession, personally. I am acquainted with the Newell curve. I have applied the Newell curse in southern California to watersheds. I will state that I consider it a practical rule for determining of run-off from a watershed. It varies somewhat in different localities. I have taken figures that have been given me on the subject of comparisons between the rainfall and run-off and applied them to the curve. The variation between the application of the Newell curve from the alleged real rainfall and run-off, is considerable in different districts. Where the curve errs in giving the true run-off, the results are apt to lie on either side of the curve; either in excess or they are too small, depending a great deal on the character of the drainage basins, and a great deal on the character of the rain storms. In cases of very high precipitation, where the average annual rainfall is great, I think the per cent. of run-off would probably be somewhat less than shown by the curve. But in cases

925 where the rainfall is not so great, more moderate rainfall, I think that, provided the drainage basin is an acceptable one, that the curve as it stands is accurate, and by accurate I mean simply by using general terms.

Cross-examination.

By Mr. CHAPMAN:

The run-off that is referred to in the application of the Newell curve is the water which is running on the surface of the ground. The gauging stations, in as far as I am aware, are located at the most feasible point for the obtaining of the greatest amount of surface flow. Beyond that, there is no effort to measure underground waters. When I speak of the great rainfall I speak of, say, from 40

to 60 inches. I say that in some conditions I consider the Newell curve as fairly active. I presume this will be answering your question. There are a number of points which directly influence the discharge of water, the average discharge of water, say, per square mile. One is the size of the drainage basin. If the drainage basin is very great, the relative run-off is less. A second fact that will influence the curve will be the character of the basin as to soil, and what might be termed geological formation. The exposure of the basin will be another influence. The character of the rainstorm very greatly influences the run-off. In the calculation that I make to produce this Newell curve, all these things are taken into consideration. It is the effort to obtain an average result. And the correctness of that average result, as applied to a particular locality, would depend entirely upon the conditions in that locality.

F. O. Cass, called for plaintiff, sworn and testified substantially as follows:

By Mr. Dunn:

926 My business is real estate. Have been in that business some eight or ten years. I have lived in southern California about twelve years; reside in the city of Los Angeles. Have resided in the country in this county, in Vernon. I am familiar with the values of real estate in the county of Los Angeles; and was familiar with the values of real estate in June, 1893, in this county. I am acquainted with the land sought to be condemned in this case; the tract of 313 acres situated on the Los Angeles river in the east end of the Providencia rancho. The value of that land is not materially different now from what it was in 1893. I have been over a good portion of the land, within the last few days; examined it with a view to placing a value on it and testifying in this case. We went over it ourselves Mr. Thomas drove up there and showed us where it was. In my opinion the market value of that land as a whole is between five and six thousand; not to exceed $6,000. I attempted to estimate the mesa and the heavy willow land, and that that was covered with light willows or with very little underbrush. In examining these different classes of land I valued them separately, and then added together the total, and arrived at this figure of not to exceed $6,000.

Cross-examination.

By Mr. Chapman:

I have been up there—the first time I was ever in through that way was ten years ago. I have driven up in through the river road, and up the river there, a great many times since. Possibly not exactly the same places, but have crossed the river there, back and forth, a great many times in that length of time. I am valuing it for general agricultural purposes and pasturage land. When I went there a week or so ago for the purpose

of being a witness in this case for the city, is the only
927 time that I ever went up there for that purpose. I should judge it was about a year ago, that I was up there last, before that time. I was up through some land above; along in through there, and have driven on this road. When we went up there with Mr. Thomas, we spent all day there and on the road going and coming. I think we drove every road, or about every road, that there was there. And then we made detours on the different lines where they said they proposed to put the laterals, and penetrated around it into the swamps and bushes there a great deal; we found the swamps along close to the river, there is one up at the upper end. There is one spot in there. You might not call it a swamp exactly; but there is water standing very close to the surface around there in spots, and heavy tules; that is what I had reference to. Of the small willows and that—the land that was the most moist, I should judge there was something over 200 acres. I valued that at $15 an acre; 213, I think, something, I had my figures; the way I figured it out; something like that. I have been engaged in the real-estate business in Los Angeles city. I have shown lands all through up above there and all around in that section, at different times, in the last ten years. I don't know that I have sold anything up there for quite a number of years; it hasn't been very much sought after. I can't tell you how many years—not as many as five. Well, less than two years ago there was one sale up in through there, that I had something to do with. That was up in Burbank; I have forgotten the price it was sold at now; I couldn't tell you. I have had something to do with making loans up there in the last five years. I have not made any sales up there, nor any purchases. I know that there is lands up there that I have tried to make loans on that I couldn't get as much as ten an acre on. Possibly I do not know of any lands being sold there for $15 an acre. I went
928 on the lands north of the river among the willows; not east of the mesa; I went on all sides; all through the willows. Not all through them, I won't say that, because there is some places it would be pretty hard to go through them, but I was on both sides of the river, and on the north line, and followed it down through, on the north line; I should say, northeast. I did not travel along the north line; it always seems west to me. We drove along the north line and I walked around in there a great deal; but we drove on the north line. On the east line, I walked there; that is what I had reference to. Up on the edge of the bluff there is a very little alfalfa, I think, I saw there. I didn't notice any alfalfa down in the bottom. That mesa land I value at $35 to $40; about $35 I should say, an acre; and the bottom on the north side of the river, where the willows grow, is part of the land I valued at about $15 an acre. That is a part of the 200 acres, the heavy willows. Where those heavier willows grow, there is a little better soil, it seems to be; and a man could get a little more wood off of it. I valued that about $20 an acre.

Redirect examination.

By Mr. DUNN:

Whenever I have showed that nature of the soil up on the bluff, the mesa land, it is very seldom I tell them anything about the bottom land; I sell the mesa land, and then deed them a little more than they intended to give them. That is the way I should do it. I should show them, in showing the character of land, I have shown them the good land.

Recross-examination.

By Mr. CHAPMAN:

929 If I were going to show it to anybody, I wouldn't show it; I doubt whether I should. I should show them the good mesa land if I was showing good land. I do not know there is more call for that bottom land than there is for the mesa land. I know it will grow alfalfa, in spots without irrigation. The size of the spots is according to how close the water is to the surface, or how handy it is. I saw the well-holes around there, the holes that were dug, that we could see. I looked into the holes that were dug, that were not covered up. I shouldn't want to try to grow alfalfa there without irrigation. I know you might grow it one season; but you would run great danger of losing it as soon as the floods come. I am not basing my estimate largely upon the propositions that the floods would come; for agricultural purposes or grazing land; if there weren't any floods to come, I would still keep it for pasturage land, or for the wood I could get off of it. The reason I said anything about the danger of losing it if the floods came, was simply because you asked me if I would put it into alfalfa. The floods were not affecting my estimate of the value; you asked me about alfalfa; if I wanted to put that in alfalfa, I think. If it were not in any danger of being destroyed by floods that would not make any difference in the valuation of the land. I don't know of any uses that you could put that land to except for pasturage. The mesa land is good barley land; that is worth something. I don't say that barley crops, taken one year with another, is more profitable than alfalfa. Alfalfa will pay all right in places. Good alfalfa land is a good thing to have, and if located that near the city of Los Angeles it is worth anywhere from a hundred to a hundred and fifty dollars an acre, if it is in alfalfa. If that land will grow good alfalfa, and is not in danger of being destroyed by floods, that wouldn't make any difference in my valuation of the land.

930 Redirect examination.

By Mr. DUNN:

It will not grow alfalfa.

Recross-examination.

By Mr. CHAPMAN:

I have raised alfalfa, and I fought gophers in alfalfa patches. I know you want something besides clear sand for alfalfa. I took a look at the excavations that were made there. I saw something there except clear sand; in some of them I did. It has got gravel; in some places there is a little soil that is made there by the foliage; some good dirt that has come down. But that seemed to be underlaid with a strata of sand again and sand on top. I examined the soil elsewhere, except where I saw it in the cuts; I was all over it; I didn't do any digging. I looked into the banks of the Los Angeles river along there. In some places I did see something there except clear sand. A foot or two of clear soil underlaid with sand again. I looked at the material that had been brought out of the wells that I saw. I saw very little good dirt. I do not own any property in Burbank; I do own some in Los Angeles city and county.

N. M. ENTLER, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My business is real-estate business. I have been actively engaged in it for about five years. I have lived in the city of Los Angeles fifteen years. I feel that I am familiar with the values of real estate in the county of Los Angeles. I was familiar with the values of real estate in June, 1893. I have examined the land sought to be condemned in this action, the 313-acre tract on the east end
931 of the Providencia rancho, along the bed of the Los Angeles river. The last time I was over it was about two weeks ago, I believe. I went over it then for the purpose of examining it with the view to fix a value in this action; am acquainted with the market value of that land, as compared with other properties of the same kind. The value of that land, I should say, is not materially different now from what it was in June, 1893. In my opinion the market value of that land, the total value, taking it as one piece, is from seven to eight thousand dollars. I have examined the different classes of land, and affixed values on them, in making this estimate on the different classes. It runs a trifle higher; about eight thousand five hundred, I believe. From those different estimates, I have arrived at this total.

Cross-examination.

By Mr. CHAPMAN:

I valued it as one piece at about $8,000, for general agricultural uses. I figured part of it as good for barley; part of it is in heavy willows; and the balance of it is general river-bottom land; good for grazing purposes principally. Weeds and wild stuff, willows, grow upon it, principally. I approximate about 165 or 175 acres river-bottom land, at about ten dollars an acre. (After examining

paper.) I figured 165 acres of general bottom land at $10 an acre. I figured a total of about 31 acres of mesa at $60; and then there is about 70 acres in heavy willows; I approximated that at about $60. There was one piece containing about 26 acres, while is lies in the river-bottom, is a little more accessible, that I valued at $20 an acre. I figured that would be good for grazing principally. I didn't see any other use that it could be put to at all. It is principally sand, overgrown with willows. It was covered in spots with willows;
932 pretty much all over, generally speaking. I do not own any land up in that section. I do own some in Los Angeles city. I have dealt in land up in that section of the country. I have shown a great many pieces up there in the last five years. I can refer to your map here; I can tell you the direction. I get turned about a little in the directions there. I have shown property that lies over in this direction. Lying between these two points; between this point here and the railroad—it must be this locality here somewhere—I could have sold improved land set to three-year-old trees, a short time ago for $60 an acre. I tried to sell it; didn't make it. I never did succeed in selling anything up there in that immediate vicinity to anybody. I think that was in the Providencia as near as I can remember. I could tell by going to my records. It belonged to Nolan & Smith. It was formerly a Mr. Garnsey's property. That is between the railroad and this locality here, and just a trifle further up; about a half a mile I should approximate it. It is a very pretty piece of land, perfectly level and well improved around it. I have never made any sales or dealt in property in the lots that are right immediately adjoining this tract of land. This is very close by it though; this piece I refer to—not over half a mile, I don't think, toward the railroad. I have never known of my own personal knowledge of any sales made in that section of the country, of river-bottom land, or mesa, at all.

Redirect examination.

By Mr. DUNN:

I never knew anybody to want to buy that kind of land.

H. S. EBERLE, called for plaintiff, sworn and testified substantially as follows:

933 By Mr. DUNN:

I have lived in southern California about ten years; my business is real estate; have been engaged in that business about eight years. I was in the business of surveying prior to that; I am a civil engineer by profession. I surveyed lands adjoining the lands sought to be condemned in this action—adjoining the ranch I presume—the Lankershim ranch. I surveyed there in 1887, I think, if I remember rightly. I am somewhat familiar with the land in this locality; have visited this 313-acre tract sought to be condemned, recently—on Monday last. I went up there for an appraisement on the land; to see the value of it; to appraise it for the purposes of this suit. I

shouldn't think there is any material difference in the value of that land from what it was in June, 1893. I value the 313 acres, taken as a whole, at between five and six thousand dollars. For the purposes of making that valuation I examined all the land pretty thoroughly. I spent there from about, I should presume, eleven o'clock, until about three in the afternoon. I spent the day going and coming and visiting the land. In valuing this land I classified it and determined the value, in my opinion, of the different classes; and this amount, five to six thousand dollars, represents the total of those values.

Cross-examination.

By Mr. CHAPMAN:

I went up there with Mr. Thomas and Mr. Cass, Mr. Hinton, Mr. Cook; I guess that is all. I have traveled through there; passed through there along the land before; along the side of the property. I am not interested in any lands up in that section. I own some in the city of Los Angeles; have dealt in lands in that section; I can't say right in that immediate section; I haven't. Perhaps a mile and
934 a half or two miles above there. I have lands up in the San Fernando grant; but that is further away than two miles. I know where I surveyed up on the Lankershim; that is in the San Fernando ranch; it is a portion of the ex-mission San Fernando. That is more particularly the section of country in which I was dealing. I am dealing in real estate there at the present time. I was valuing this particular tract for agricultural purposes. I figured about 186 acres, altogether, in the river bottom; and 160 acres of that land I figured at $10 an acre; and there was 26 acres that I figured at $20 an acre. The mesa land I figured, about 36 acres, at $40 an acre. I went up there with Mr. Thomas. We went in a wagon; and of course we had to walk a good deal besides. This is the map here—we entered on the land at the west end, in here; this is the west end. We entered on the property here at this point. There is a road runs down here; and we drove along in through this portion. We come pretty close to this point here. This is up on a little bank, I should judge, if I remember rightly. There was sort of a bluff there. We walked down this line, and across—after walking down this line, we struck—I presume it was for a tunnel; the willows were cut through. And walked down through into this portion. I think this is the 26 acres. We walked through this portion, and back again, across to the wagon. This is a little road here. We drove down this portion of it. Then, coming back, we came around, and across on this side of the ranch was a hill. This is the outline here, I presume. When I say "this part of the ranch," I am speaking of the 26-acre tract, in the western portion; and on the other side of the river close to the high bluff, the line runs across here, there is a little portion there which was in barley. That I judge was about five acres there in barley. And there was about an acre across at this end, which runs
935 up on the high mesa, and on this side, it seems there was a little valley, like. There were some large oak trees there,

which mark the corner stake which runs over this little hill, this knoll here. After leaving that point, we crossed back again; this map is not just exactly the same as the map we had. That shows more particularly when we got up around here, the two roads. There are two washes running down. There is a wash runs down this portion of the ranch here. Main street on the map designated I think, the first wash, if I remember rightly. We drove up there and walked up along this portion here; but we couldn't get across on account of the river. And we drove around to this farthest wash here. I am pointing to the extreme northern part of the tract sought to be condemned. And crossing over onto this mesa, over on this side; cross this place, back again, to the divide there, I presume you call it—where the water ditches—I think. And then coming back this is in the willows here, very dense willows. Crossing up in here we could only get through there when the trail was cut through. The willows being so very heavy, it would be impossible to get through otherwise, I should judge.

W. O. Dow, called for plaintiff, sworn and testified substantially as follows:

By Mr. DUNN:

My business is real estate. I have been in the business six or seven years. I have lived in southern California about twenty years. Before I went into the real-estate business I was a civil and locomotive engineer. I am familiar with the land sought to be condemned in this action, the 313-acre tract in the east portion of the Providencia rancho on the Los Angeles river. I have been on that land frequently; have been on it lately—couple or
936 three weeks ago was the last time I was on it. I was there for the purpose of looking it over carefully and refreshing my memory in regard to the location and the value of the property. The value of that property is not materially different now from what it was in June, 1893. I have an opinion as to the market value of that 313 acres. In my opinion that tract is worth, as a whole, between $5,850 and $6,000. For the purposes of forming my opinion I examined the land and classified it; placed values in my own mind upon the different classes, and the result of that examination and classification makes a total of from $5,850 to $6,000.

Cross-examination.

By Mr. CHAPMAN:

I have dealt in real property in that section of the country. I sold property frequently across the river from this land in the vicinity of Burbank Tropico. I don't remember the exact date of the last transfer there. We have all of George W. King's land at Burbank for sale. I don't remember when was the last transaction in that immediate vicinity. Within the last three years. I classified this land into different classes for the purpose of my valuation.

One class was river bottom, about 175 to '80 acres, valued at about $10 an acre. The mesa land about $40 an acre. I figured on about 30 acres of hill land at $20 an acre; hill land contained scattering oak timber. The King land is altogether a different class of land than this, and is different also in the prices. Lots 66 and 67 in the Providencia Land and Water Company, are on the north side or northerly side of the river; as I remember it, I don't think this tract goes up and affects those lots. I never saw that map of that section of the country before. I can identify the location of lot 66 and 67 by that map. Suppose that the red line of the elongated
937 tract there is the north boundary of the tract sought to be condemned, they are, as I understand it, entirely north of that red line, and come down to the red line. I don't know how much Mr. King has now in 66 and 67. We never have sold a great deal of it for him. He has sold it through different agents. His land is all scattered around through there clear up to Burbank. We didn't sell any portion of lot 66 or 67 for him, to my knowledge. I don't know the prices at which it was sold. There might have been some of it sold at a hundred dollars an acre. I don't know anything about it, not in those two lots. I don't know of any place where lands have been sold in that bottom land for any such price as fifteen or twenty or twenty-five or thirty dollars an acre; I don't know of any land having been sold on that river bed along in there at any figure. We have had all of Mr. King's property up there in that part of the country on our books for some time. I could not say without referring to the books whether we had lots 66 and 67 on our books. I could not by lot numbers name any lots that we had for sale on our books. We did not have any of it for sale at any of the prices that I have named for any part of this land; we never had that quality of land from Mr. King for sale. Mr. King's land was all accessible and was a good quality of agricultural land. By "accessible" I mean it was all of it on streets so as to be got at, driven to, at almost any time of the year without any trouble. It would be a good deal of trouble to make streets through this land and keep them there, in my opinion. I have sold property along in the San Fernando valley. Outside of some 40 or 50 acres of mesa land, and this hill land, the balance of all that land to be condemned, is subject to overflow. I never happened to be up there when the river was high. I never saw it overflow—all of it; never saw anybody that did see it over-
938 flowed, but I have seen some very forcible indications that it has been overflowed. The whole country is cut down on almost a level with the river bed, the present river bed. All of the property that is, as I understand to be condemned under this proceeding, aside from the 40 acres of the mesa land and the hill land. That is what I call the river bottom. The river bottom is all the way from 6 inches to 10 feet above the level of the surface there. All along the ordinary flow in a great many places the river bottom is no more than six inches above the surface of the ordinary flow of the Los Angeles river; right at the edges and some places there, there is—I have noticed at times in going through the willows there

hunting, where there would be little barancas that I always had the opinion, and I have still, that they were about on a level with the river. It is my opinion, from the observation that I have had of that particular section right along the river, that it is all underlaid with quicksands, and that movable sand, nearly all of it. When I was up there a couple of weeks ago, I looked into some of the excavations; paid particular attention to the larger one in the mouth of the Tejunga. I never paid any attention to it in regard to its length, but I should say something in the neighborhood of from 5 to 7 hundred feet. I just looked along it, walked along it. I didn't pay particular attention to quicksand, because that is not where I would locate the quicksand. I would locate the quicksand in the river bed. Take that particular place where that excavation is made, running into the Tejunga, the Los Angeles river comes close up to the bluff on the south side, and it is my opinion that the quicksand is the greater part of it, covering the wider scope, is south of that point, in the Los Angeles river. That is more of a gravel-y-made soil than further down the river. I didn't examine the land at all
939 where I propose these quicksands to be. It is just simply my opinion. I have crossed the river different times. This land is a wash; it is nothing but a sandy wash, overgrown in places with willows and weeds. I formed my opinion to the extent that there was between 60 and 70 acres overgrown with a good heavy growth of willows. I split the difference and called it 65 acres of a good heavy growth of willows. Some of the balance of the hundred acres is marshy, open, covered with soft grass in spots, gravel and sand, and others grown with weeds and scattering willows—a kind of weed that grows along the rivers here, sort of an elder; I never paid any particular attention to it; I would call it a willow though. There is some places up there that had rushes and tules on it. I was putting my valuation upon it simply for agricultural purposes; farming land. I own property in Los Angeles city; do not own any up in that section of the country.

Redirect examination.

By Mr. DUNN:

I never had a customer or knew of anybody else ever having a customer that wanted to buy this particular land.

Plaintiff rests with the exception of two witnesses, one an engineer and one other real-estate man.

The COURT: The plaintiff rests then, with those exceptions. We will take that as settled.

Mr. SCOTT: At this stage of the proceedings I think it would be a very good time to pass upon that demurrer.

The COURT (after discussion): Make the order, Mr. Clerk, that the demurrer to the last amended complaint, is overruled.

Mr. SCOTT: And that the answer to the original complaint stand as to the amendment.

940 The COURT: To the complaint as now amended.

Mr. DUNN: For the purposes of use in argument and making this record, we have agreed to put in both of these tables of rainfall. We will ask to have the blue one marked Plaintiff's Exhibit 28, and the other Plaintiff's Exhibit 29. They are as follows:

TABLE

Showing annual rainfall at various points in Los Angeles Co., Cal., and the average based on 15 years' record.

Compiled from Government reports and private records of Mr. Van Nuys.

| Date. | Los Angeles. | | Newhall. | Ravenna. | San Fernando. | Van Nuys' home ranch. |
|---|---|---|---|---|---|---|
| | Elev. | | Elev. 1268 | Elev. 2358 | Elev. 1065 | Elev. 770 |
| 1880 | 18.60″ | .65 | 13.30″ | 7.94″ | 12.63″ | 11.46″ |
| 1881 | 5.60″ | .53 | 8.23″ | 3.36″ | 5.30″ | 3.45″ |
| 1882 | 10.70″ | .74 | 9.79″ | 7.48″ | 8.15″ | 9.04″ |
| 1883 | 14.20″ | .14 | 13.76″ | 6.79″ | 11.50″ | 13.25″ |
| 1884 | 40.50″ | .89 | 44.20″ | 28.09″ | 27.02″ | 33.62″ |
| 1885 | 10.60″ | .69 | 13.63″ | 7.70″ | 11.70″ | 15.54″ |
| 1886 | 17.20″ | | 14.37″ | 14.02″ | 15.53″ | 14.23″ |
| 1887 | 16.40″ | .27 | 21.01″ | 14.38″ | 14.10″ | 21.09″ |
| 1888 | 20.90″ | 1.04 | 22.18″ | 12.58″ | 18.11″ | 16.94″ |
| 1889 | 33.30″ | .31 | 34.07″ | 21.71″ | 33.21″ | 30.02″ |
| 1890 | 12.60″ | .69 | 14.10″ | 8.00″ | 10.90″ | 7.64″ |
| 1891 | 12.90″ | .84 | 15.35″ | 8.96″ | 10.94″ | 9.64″ |
| 1892 | 18.72″ | | 19.73″ | 8.45″ | 13.92″ | 14.26″ |
| 1893 | 21.90″ | .96 | 18.48″ | 11.59″ | 16.75″ | 15.21″ |
| 1894 | 7.51″ | | 10.96″ | 8.15″ | 8.35″ | 7.40″ |
| Total for 15 years | 261.69″ | | 273.16″ | 169.20″ | 228.11″ | 222.79″ |
| Average | 17.44″ | | 18.21″ | 11.28″ | 15.21″ | 14.85″ |
| 1895 | 12.55″ | | | | | |

# U. S. Department of Agriculture, Weather Bureau, office of the observer.

## Prepared for distribution by the Los Angeles chamber of commerce.

Los Angeles, Cal., *April* 15, 1895.

Table showing the highest, the lowest, and the average temperature, and the rainfall at Los Angeles, California, by months from July, 1877, to March, 1895. Data compiled from the records of the U. S. Weather Bureau office at Los Angeles, by George E. Franklin, observer in charge. Temperature data obtained from self-registering instruments.

| Year. | January. | | | | February. | | | | March. | | | | April. | | | | May. | | | | June. | | | | July. | | | | August. | | | | September. | | | | October. | | | | November. | | | | December. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | Temp. | | | Rainfall. | |
| | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | Max. | Min. | Mean. | | |
| 1878 | 72 | 37 | 36 | 3.33 | 71 | 41 | 55 | 7.68 | 76 | 41 | 57 | 2 57 | 80 | 42 | 59 | 1.71 | 89 | 47 | 63 | .66 | 81 | 47 | 67 | .07 | 88 | 52 | 70 | .00 | 89 | 54 | 71 | .00 | 103 | 50 | 70 | .00 | 91 | 43 | 65 | .14 | 81 | 37 | 59 | .00 | 88 | 30 | 55 | 4.70 | 20.86 |
| 1879 | 74 | 36 | 53 | 3.59 | 80 | 39 | 56 | .97 | 99 | 42 | 59 | .49 | 88 | 42 | 60 | 1.19 | 97 | 43 | 62 | .24 | 104 | 51 | 68 | .03 | 84 | 52 | 69 | .00 | 98 | 53 | 72 | .00 | 101 | 47 | 69 | .00 | 96 | 42 | 66 | .93 | 84 | 36 | 57 | 3.44 | 76 | 30 | 53 | 6.53 | 17.41 |
| 1880 | 76 | 39 | 54 | 1 33 | 70 | 34 | 51 | .56 | 74 | 36 | 52 | 1.45 | 53 | 40 | 57 | 5.06 | 97 | 42 | 63 | .04 | 83 | 50 | 66 | .00 | 85 | 52 | 65 | T. | 87 | 52 | 69 | T. | 91 | 44 | 66 | .00 | 89 | 44 | 63 | .14 | 85 | 35 | 56 | .67 | 80 | 38 | 56 | 8.40 | 18.65 |
| 1881 | 71 | 37 | 53 | 1.43 | 86 | 42 | 59 | .36 | 89 | 37 | 57 | 1.66 | 94 | 48 | 63 | .46 | 89 | 41 | 64 | .01 | 88 | 48 | 67 | .00 | 96 | 52 | 72 | .00 | 100 | 52 | 71 | T. | 102 | 50 | 70 | T. | 82 | 43 | 61 | .82 | 81 | 34 | 57 | .27 | 79 | 35 | 55 | .52 | 5.53 |
| 1882 | 74 | 32 | 50 | 1.01 | 77 | 32 | 51 | 2.66 | 88 | 35 | 56 | 2.66 | 89 | 40 | 58 | 1.83 | 86 | 42 | 64 | .63 | 87 | 50 | 66 | T. | 98 | 52 | 71 | .00 | 99 | 57 | 73 | .00 | 100 | 46 | 70 | T. | 88 | 44 | 63 | .05 | 81 | 36 | 58 | 1.82 | 82 | 35 | 57 | .08 | 10.74 |
| 1883 | 82 | 30 | 53 | 1.62 | 82 | 28 | 52 | 3.47 | 84 | 43 | 58 | 2.87 | 89 | 39 | 58 | .15 | 100 | 40 | 64 | 2.02 | 100 | 52 | 71 | .03 | 90 | 52 | 73 | T. | 98 | 59 | 72 | .00 | 104 | 53 | 74 | .00 | 83 | 44 | 62 | 1.42 | 84 | 42 | 60 | .00 | 80 | 37 | 56 | 2.56 | 14.14 |
| 1884 | 78 | 34 | 54 | 3.15 | 81 | 38 | 56 | 13.37 | 72 | 37 | 56 | 12.36 | 80 | 42 | 59 | 3.58 | 79 | 47 | 63 | .39 | 98 | 50 | 68 | 1.39 | 99 | 52 | 73 | .00 | 102 | 52 | 73 | .00 | 92 | 46 | 67 | T. | 89 | 43 | 63 | .39 | 88 | 39 | 61 | 1.07 | 76 | 36 | 53 | 4.65 | 40.39 |
| 1885 | 72 | 38 | 55 | 1.05 | 81 | 36 | 57 | T. | 85 | 42 | 62 | .01 | 87 | 45 | 63 | 2.01 | 80 | 49 | 66 | .06 | 90 | 47 | 67 | T. | 98 | 52 | 72 | T. | 106 | 51 | 75 | T. | 108 | 51 | 71 | .00 | 102 | 42 | 66 | .30 | 78 | 40 | 60 | 5.55 | 82 | 40 | 58 | 1.65 | 10.69 |
| 1886 | 75 | 32 | 55 | 7.78 | 81 | 41 | 60 | 1.41 | 76 | 37 | 55 | 2.52 | 80 | 42 | 59 | 3.32 | 89 | 44 | 65 | .00 | 92 | 48 | 69 | .11 | 98 | 50 | 72 | .24 | 98 | 54 | 75 | .21 | 91 | 48 | 68 | .00 | 82 | 41 | 60 | .02 | 85 | 34 | 57 | 1.18 | 85 | 37 | 56 | .26 | 17.20 |
| 1887 | 80 | 33 | 55 | .20 | 82 | 35 | 51 | 9.25 | 85 | 41 | 60 | .29 | 87 | 40 | 60 | 2.36 | 92 | 44 | 64 | .20 | 100 | 47 | 68 | .07 | 98 | 51 | 72 | .07 | 94 | 52 | 70 | .00 | 91 | 49 | 69 | .15 | 93 | 47 | 66 | .17 | 86 | 39 | 60 | .80 | 73 | 35 | 53 | 2.68 | 16.27 |
| 1888 | 71 | 31 | 50 | 6.04 | 74 | 39 | 54 | .80 | 75 | 36 | 56 | 3.17 | 99 | 44 | 63 | .12 | 83 | 45 | 63 | .05 | 94 | 50 | 69 | .01 | 95 | 49 | 73 | .03 | 97 | 51 | 73 | .08 | 98 | 55 | 74 | T. | 98 | 44 | 66 | .40 | 83 | 40 | 60 | 4.02 | 79 | 41 | 57 | 6.26 | 21.04 |
| 1889 | 71 | 32 | 52 | .25 | 84 | 33 | 56 | .92 | 81 | 44 | 59 | 6.48 | 93 | 46 | 62 | .27 | 94 | 46 | 63 | .65 | 81 | 51 | 66 | .01 | 99 | 54 | 71 | T. | 95 | 53 | 72 | .61 | 103 | 52 | 73 | .00 | 89 | 50 | 66 | 6.96 | 82 | 43 | 61 | 1.35 | 68 | 40 | 55 | 15.80 | 33.31 |
| 1890 | 67 | 34 | 49 | 7.83 | 81 | 35 | 54 | 1.36 | 81 | 40 | 58 | .66 | 94 | 42 | 59 | .22 | 90 | 43 | 63 | .00 | 105 | 48 | 68 | .02 | 97 | 55 | 73 | .00 | 98 | 56 | 73 | .03 | 94 | 44 | 71 | .06 | 99 | 46 | 68 | .03 | 96 | 41 | 66 | .13 | 82 | 43 | 61 | 2.32 | 12.69 |
| 1891 | 80 | 34 | 56 | .25 | 71 | 33 | 53 | 8.56 | 82 | 40 | 58 | .41 | 86 | 42 | 59 | 1.26 | 74 | 47 | 62 | .31 | 89 | 49 | 66 | .00 | 109 | 54 | 74 | T. | 96 | 54 | 75 | .00 | 100 | 52 | 73 | .06 | 89 | 46 | 66 | .00 | 85 | 40 | 61 | .00 | 75 | 33 | 55 | 1.99 | 12.84 |
| 1892 | 81 | 37 | 57 | .88 | 74 | 38 | 54 | 3.19 | 81 | 36 | 57 | 3.39 | 88 | 40 | 59 | .22 | 99 | 42 | 62 | 2.07 | 88 | 45 | 64 | .06 | 99 | 50 | 68 | .00 | 94 | 53 | 72 | .01 | 95 | 50 | 68 | .00 | 96 | 40 | 64 | .33 | 90 | 41 | 62 | 4.40 | 81 | 35 | 54 | 4.18 | 18.72 |
| 1893 | 84 | 35 | 57 | 6.29 | 79 | 38 | 55 | 2.21 | 88 | 31 | 54 | 8.52 | 84 | 39 | 58 | .19 | 90 | 45 | 63 | .06 | 90 | 48 | 66 | .03 | 89 | 50 | 70 | .00 | 92 | 54 | 71 | .00 | 90 | 48 | 66 | T. | 91 | 46 | 63 | .75 | 86 | 39 | 57 | .20 | 88 | 37 | 58 | 3.65 | 21.96 |
| 1894 | 75 | 32 | 51 | .94 | 73 | 35 | 51 | .49 | 82 | 35 | 54 | .37 | 85 | 41 | 59 | .13 | 80 | 46 | 60 | .20 | 83 | 46 | 63 | T. | 88 | 51 | 67 | T. | 97 | 52 | 70 | .01 | 99 | 49 | 69 | .73 | 90 | 45 | 66 | .02 | 92 | 38 | 59 | .00 | 75 | 39 | 54 | 4.62 | 7.51 |
| 1895 | 77 | 37 | 52 | 5.84 | 84 | 36 | 57 | .46 | 84 | 38 | 56 | 3.77 | ..... | ..... | ..... | .46 | ..... | ..... | ..... | .19 | ..... | ..... | ..... | .01 | ..... | ..... | ..... | T. | ..... | ..... | ..... | T. | ..... | ..... | ..... | T. | ..... | ..... | ..... | .24 | ..... | ..... | ..... | .80 | ..... | ..... | ..... | .78 | 12.55 |
| Avr. | 76 | 34 | 53 | 2.88 | 78 | 36 | 55 | 3.27 | 82 | 38 | 57 | 2.98 | 87 | 42 | 60 | 1.42 | 89 | 44 | 63 | .45 | 91 | 48 | 67 | .11 | 94 | 52 | 71 | .02 | 96 | 53 | 72 | .05 | 98 | 49 | 70 | .06 | 91 | 44 | 64 | .76 | 85 | 39 | 60 | 1.40 | 79 | 36 | 56 | 4.15 | |

Remarks:—The average temperature for the seasons, deduced from the tables, is as follows: Winter, 55°; spring, 60°; summer, 70°; autumn, 65°.
The average seasonal rainfall, 17.56 in. The symbol T in the rainfall column indicates a trace of precipitation.

It will be observed on examining the table that the lowest temperature recorded during the cold period of the year, or rather its calendar equivalent, was 28 degrees, and during the season embracing fifty-four months there was but six of them when the temperature fell below the freezing point of water and then this temperature was maintained but a limited time, usually in the early morning after which a material rise occurred. A fact to be noted in considering the table, in connection with the summer temperature, is that during the period of greatest heat, the percentage of atmospheric moisture is very low, which so modifies the temperature that the heat is neither oppressive nor prostrating and which is well illustrated by laborers continuing work during the hottest period. 1896: Jan., 3.23; Feb., T.; March, 1.97.





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942 A. E. KOEBIG, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

Mr. DUNN: I happen to recollect, your honor, that there was a question of water power had been raised, that I hadn't touched upon.

The WITNESS: I am familiar with the cost of developing horse-power and the value of horse-power in this vicinity. Four years ago, when I made examination here in this city what the horse-power would be worth, the value I arrived at was $50 per annum per horse-power. I should judge the price of horse-power in Los Angeles is decreasing on account of having cheaper fuel by oil and so forth, in here. I haven't made the figures yet on the amount of horse-power that could be developed by the use of the surface flow of the river on Pomeroy and Hooker's land sought to be condemned. Assuming that it would be possible to develop 41-horse power by the use of the flow of the river on this land, in my opinion, to put in the plant, conduct the water to the plant, make the proper foundations and diversions, altogether, I would put the cost at a rough estimate of not less than $30,000, and perhaps more.

(No cross-examination.)

J. D. SCHUYLER, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

I never saw any development of power along the bed of the Los Angeles river; there is a development of power on the water company's—by water taken from the river in a flume. I am acquainted with the value of horse-power in this vicinity. About two
943 years ago I made a general examination of the subject here with the view of determining what the value of power transmitted by electricity here would be from the Arrowhead mountain watersheds, and ascertained that it would be in the neighborhood of $50 per annum per horse-power. I judge that the value of power is decreasing in this locality, on account of the cheapening of fuel. I have estimated the number of horse-power that could be developed by the use of the surface flow of the river on this tract. With 1,100 inches of water measured at the upper end of the tract, with a fall of about 40 feet there is in the river, and taking the ordinary deficiency of water wheels, the net power would be about 27-horse power. I haven't made a close estimate on the cost of developing that power, but I should think between thirty and forty thousand dollars. You would have to keep one man employed there. I am familiar with the land; it has the appearance of having been overflowed. To develop this water power it would first be necessary to construct a strong, tight diverting dam, capable of withstanding the severest floods of that river, and headgates to prevent the floods of the river entering the conduit, and sand-gates for keeping out the sand from the conduit; works of that character.

There would have to be a conduit from the upper end of the tract to the lower, either a flume or a pipe. That might be supported on the side of the hill, to get the elevation for the drop of the water.

Q. Considering all the conditions would you consider it a practicable business proposition?

Mr. CHAPMAN: We object to that on the ground it is incompetent.

By Mr. DUNN:

Q. To develop this water power to attempt to?

The COURT: I will overrule the objection. Answer.

A. I shouldn't consider it a practical business proposition.

944 W. O. DOW, recalled for plaintiff, testified substantially as follows:

By Mr. DUNN:

In considering the property sought to be condemned, which is indicated upon this Defendants' Exhibit D, I consider in fixing my estimate upon the different pieces of land, what the property was worth; whether it was sold in conjunction with the whole 1,400-acre tract, which is indicated by the red lines running away south, or otherwise. The taking of the 313 acres will not damage the balance of the 1,400 acres, in my opinion, over and above the estimate that I put on it. I considered that is what it is worth either with or without the other land. I don't see how the taking of the 313 acres can make the rest of the tract less valuable. If I was to put a value upon the whole tract, I would estimate this property at the figure I put on it in conjunction with the other. I wouldn't say it would damage the other in the least. If I were to value the balance of the tract after this was taken off, I wouldn't value it any less than I valued it now with this on, per acre.

Cross-examination.

By Mr. CHAPMAN:

To get in and out of the remainder of this 1,400-acre tract you would either have to come through from this side, on these lines, or this side of the Los Feliz, or else go around through the Cahuenga pass. I know where the 1,400 tract is; I have known of that property being there for a great number of years. I have been in and around over the hills in part. I never went in there to locate the lines or the points of this property, or anything. I never had the lines of the points shown to me at all by anybody on the
945 ground. I know approximately where they are. I think I could take a map of the tract and go up there and locate the lines of the tract pretty closely. I have been over the roads there and through the canyons there at different times. To go the most direct route from Los Angeles city to the balance of this 1,400-acre tract it is a very bad road in a great measure. I should go up through the Los Feliz and follow right up the Los Angeles river.

I have been on the north and west boundary of the 26 acres, have been along the north boundary of the 314-acre tract; not right on the boundary places, because it is in the river in some places. I know where it is located. The Pomeroy and Hooker tract, the 1,400 acres, as I understand it from the map, includes part of the 313. You can get out without passing over this; you could get to it by going through the Cahuenga pass; that is about the only way unless you build a road from the Los Feliz or go through some of the valley there to it. All of the 1,400-acre tract that would be north or west of the north or west line of this 313 acres, borders upon the Los Angeles river. I said that the north boundary of this tract is the north boundary of the Pomeroy and Hooker tract, in that particular location. As I remember the whole of that property, there is part of that ranch runs on up the river beyond this property here, as I remember; the old ranch. I never had the lines, that west line, pointed out to me definitely, either on a map or on the ground, but I can form an estimate of the distance up there.

Redirect examination.

By Mr. DUNN:

I know where the road from the Cahuenga pass turns and crosses the hills; the road where you drive through the fields; open the gates, I believe. There is no other road besides that from the west
946 down onto this property, that I know of; not coming in from the west, not that is established now. I didn't discover upon any of my visits any road from the north across this land and onto the 1,400-acre property. I don't see why there couldn't be such a road made just as easily across at a point west of this land. I didn't discover any paved streets there. I don't see any reason why a road couldn't be made almost as easily anywheres and come down there as the one where I have always been used to go in on.

Recross-examination.

By Mr. CHAPMAN:

I should say that the remainder of the Pomeroy and Hooker tract outside of this 314-acre tract continued on up the river pretty near a mile in a westerly direction. In reference to the point of the compass I always have considered, and do now, that the river ran in westerly direction at that point. Of course, it might be a little south of west or north of west. I mean that the river runs easterly. I know a great deal of the 1,400-acre tract, not included in this 1,400-acrea tract, lies south of the tract. It is my understanding that that particular piece of land, the boundary is in my estimation from something like three-quarters of a mile up the river from the westerly line of this 313 acres. I say if there is any road coming down here to this land, you can build another one out through here just as well. It is my opinion that Pomeroy and Hooker don't own much of the land there across the river on the north side of the river. It isn't my understanding that

Pomeroy and Hooker own the Providencia subdivision, through which they can get onto this land. There is a road through it; and there is also on the other property several roads. There is several roads that come down through that other property; through that whole country there. There is a road comes
947 down through the Lankershim to the Cahuenga pass, and roads running from that road through to Burbank. From Los Angeles city there is no road that goes out there except through this tract that is sought to be condemned, unless you go over the Cahuenga pass. To go from this court-house to the Cahuenga pass I would go out New High street to Bellevue avenue, and go out Bellevue avenue until I got into one of the Cahuenga roads, and then go through. I would go clear to the western boundary of this city before I would strike any Cahuenga road. The topographical features of that portion of the Pomeroy and Hooker tract which lies to the west and southwest of this land, along the river are hills, with valleys and canyons. There is a point of hills runs right out right to the river at the west boundary of this 313 acres; and then comes in quite a wide valley; and up and down the river, from there up to the north or west boundary of this land, is the same way. I never paid any particular attention as to the number of acres of tillable land there is on the balance of the 1,400 acres aside from the 313 acres. I couldn't form an idea. I might miss it a hundred acres; it is a close matter of opinion what is tillable land and which is not. The banks of the river, the southern bank on the north side of the Pomeroy and Hooker land, that does touch the river, to the south and west of this tract, are very steep; that is, they break off. The river in high water comes right down pretty close to it. There isn't a great deal of land as a rule up the river from this 313 acres—there isn't a great deal of land between the river bed proper and the bluff. Those bluffs are steep in places; they are not very high; no trouble at all for stock to go up and down them in places. You can go up and down them afoot. It would take a man from two hours to half a day—it depends on where he tackles that bluff—to make a wagon road up and down it. I think in
948 half a day he could make a wagon road up and down this bluff, and haul as much as he could to go over the wagon road going onto that land now. You come into this 1,400-acre tract from the Cahuenga road; I don't know just exactly where you would strike this road; that is, in regard to the points of the compass. If I wanted to get from here and go up the San Fernando valley and make a road onto this property I should come in right above this 313 acres into the larger valley there. The Cahuenga pass, so called, is the principal wagon road and about the only convenient one through that range of mountains. If the river there runs east and west—or runs southerly you would come into this land from the west, south, southwest. As I say, I should judge the extreme length of the balance of the 1,400 acres, easterly and westerly, is about a mile; from three-quarters of a mile to a mile. The Cahuenga Pass road has come into this land from the southwesterly side of it; the Cahuenga road is in that direction.

G. W. STEVENS, called for plaintiff, sworn, testified substantially as follows:

By Mr. DUNN:

I am a well-driller; have been in that business six or seven years. I bored the wells for the city of Los Angeles on the Pomeroy and Hooker tract up the river. I bored three for them. I bored well number 1 and well number 5 upon this map; well number one being next to the cliff, close to the river, and well number 5, which is the fourth well from the river. Those wells were bored by me. I was in the immediate neighborhood when well number 7 was bored; the last one to the north; that was bored by the steam drill.

The flow of water in well number 5 and in well number 7
949 was much lighter than that obtained in the upper wells that I bored upon this land. The flow in well number 1, as bored by me, was very much similar to the flow of the water upstream farther on this land.

Cross-examination.

By Mr. CHAPMAN:

I was at well number 7 nearly every day. They worked there night and day for about three consecutive days. I was there upon the first day, and the evening of the last night they worked. I was there on the first day about noon; during the noon hour; they were sixteen feet deep; I was there about half an hour. They were drilling while I was there. They were also drilling when I was there on the evening of the last day. They continued to work after that until three o'clock of the next day. I was there probably a half an hour, maybe a little more. I didn't take the time.

Redirect examination.

By Mr. DUNN:

There was not sufficient water in number 5 to run the drill—there was for the last ten feet. We went into the water plane about 10 feet, to my knowledge, before we had sufficient water to run the drill. I was there in that vicinity while well number 4 was being drilled or bored. From the nature of the work that I see while I was there, the flow of water in that well compared with the flow in well number 1 was a good deal similar. I saw the rock that was taken out of the bottom, the last borings, of wells numbers 1, 4 and 7. I think that was bed rock.

Mr. CHAPMAN: We object to it, upon the ground there is no foundation laid for the testimony of this witness as an expert.

The COURT: Objection sustained.

950 Witness resumes: I have been in the business of boring wells six or seven years; this is my constant employment. I am familiar with the underground formations through the section of country I have worked over.

Q. State whether or not in your opinion the rock which was struck in wells number 1, 4 and seven was bed rock.

Mr. CHAPMAN: We object to it upon the same ground.

The COURT: Objection sustained. You haven't shown that he had worked over any of this country.

Witness resumes: I am only familiar with the hills nearest the well I made. I noticed the formation in those hills; it lays in stratas of rock and shale; sand. The material in the bottom of well number 1 was shale. I didn't make a personal examination enough to be able to answer as to whether it was of the same character as that in the hill adjoining. It was of the same general character. I saw the borings from the bottom of well number 4; I wouldn't consider it rock; it was cemented sand; in my opinion it would be shale. The shale becomes harder after it is taken out of the water; but the formation that was found in the bottom of well number 4, I think, becomes softer.

Recross examination.

By Mr. CHAPMAN:

When I speak of well number 4, I had reference to well number 4 on the map. (Indicating.) I have been engaged in boring in that vicinity up in the river bed of the Los Angeles river, or near there, before I did this work; to my knowledge it was on the Pomeroy and Hooker land; not down in this vicinity with reference to this map. I bored in the city of Los Angeles; the nearest to that would be on North Main; somewhere between number four and five
951 hundred; I couldn't tell exactly. That would be upon the west side of Main; it belonged to the Sunset Wine Company. I bored 150 feet. I found blue shale continually. I didn't have anything to do with boring a well back of the Baker block, nor for the Zoberlein brewery.

Mr. DUNN: Now, may it please the court, during the last day or so, the defendants, I believe, have been doing some boring also on this property in one of the wells, and I want to later, at some time in the case, put on a witness with reference to that. I can't do it now, because they are still boring. I want to rest.

The COURT: That would come on, I suppose properly in surrebuttal.

Mr. DUNN: I expect so. That is the only witness we have. With that we rest, anyway.

Would you have any objection to my making a correction in Mr. Schuyler's testimony, without putting him on, in your favor?

Mr. CHAPMAN: We will just agree about that. I was going to ask him myself.

Mr. DUNN: Mr. Schuyler's figures, where he says "27-horse power" should be "37."

Mr. CHAPMAN: Where he says "27-horse power," he meant "37."

*Rebuttal.*

H. T. HAZARD, called for the defendants in rebuttal, sworn and testified substantially as follows:

By Mr. CHAPMAN:

I reside at 2826 South Hope street; I have been in this city about 43 years. I had charge of the East Side Spring Water Company during its existence. I was the manager of the concern and I think I was vice-president; I am not sure. I had the entire charge of it, and as to my official capacity, so far as the corporation was
952 concerned, I don't remember. I think I was vice-president and manager of the concern. We were furnishing water to the section known as Brooklyn Heights proper. That is the section of the country that aligns Brooklyn avenue—call it Brooklyn Heights. The pumping works was next to the county hospital, down the brow of the hill—to the left of it—the river bottom. I don't know that it was the river bottom. It was after you came off the mesa and went down the bottom; the river was some distance from it. The course of the stream was between a quarter and a half mile from that, I should think; maybe half a mile distant; something in that neighborhood. When we purchased into it they had a large hole—might have been 40 by 50 feet; and after I went in there and took charge of it I cut off the larger portion of it and excavated a hole about—I suppose it was 10 or 12 feet wide and 16 or 18 feet long and covered it over with roofing. The bottom of the hole from the surface of the ground at that point may have been 10 feet, possibly 12. The water, after it would stand over night, and when they were not pumping at night, I suppose would be five or six feet deep. If they pumped all day rapidly—because, of course, in the summer time, the summer months, there was a large use of water, and they would run the pump up to its highest capacity and they would pump a great deal more water. They would run it down pretty well. I suppose maybe—I am guessing now—because I never took much notice of it, maybe a foot and a half of water in it—maybe less. I don't know how much water we did pump when we was pumping it at its fullest capacity. I have heard the amount stated from the engineer, but I never figured it myself. I don't pretent to be versed in those matters, and as to the exact quantity, I don't remember. The engineer, Mr. Seville, the last I heard of him, he was working for the Union iron works in San Francisco. He went to the World's Fair.
953 He passed through here; that's the last I saw of him. I don't *don't* know what his reports of the pumping capacity when it was running, as to quantity. My recollection is we bought in there about '87 or '8; '87, probably; along about that time. We continued to run it about four years, I guess.

Cross-examination.

By Mr. DUNN:

We never took the levels of that hole above the river bed except with an ordinary carpenter's level. We concluded that was about, all the way from 8 to 12 feet; we never put any surveyor's instrument on it; I should think it would be nearer a half mile than a quarter of a mile from it. It's on the east side of the river, just this side of the county hospital; I should think it was three-quarters of a mile below Buena Vista Street bridge.

M. L. WICKS, recalled for the defendants in rebuttal, testified substantially as follows:

By Mr. CHAPMAN:

I remember the Beaudry water works. I purchased from Mr. Beaudry, in connection with Mr. Stowell, the Beaudry water works, which supplied the hills with water. We supplied all the hill portion of the city running down to Sixth and Ninth streets; we bought it in 1886. At that time, but before we had ever arranged with the city about the main supply ditch, the water that supplied this Beaudry water system was obtained by pump between Upper Main and San Fernando street, just opposite this end of the viaduct which crosses the tracks of the Southern Pacific Railroad Company; I suppose two or three hundred feet from Upper Main street; I think it was a couple of thousand feet from the flow of the Los Angeles
954 river, on the west side of the river. We pumped from 30 to 40 inches of water, miners' measurement. It would run from four to five hundred thousand gallons in 24 hours. The well itself was a place about 20 feet square, and there was a feed or ditch running off from that well, probably 60 or 70 feet away from the hole and following the course of some old tules that had been there. We continued to run those works about a year. We did not acquire the title to that land, and under our purchase we were to remove it at the end of a definite period, and we did. The well we pumped from was 20 to 25 feet deep at the deepest point. The water stood within about 10 feet of the surface. I never noticed whether our pumping operations had any effect on the flow of the Los Angeles river; I never looked to see whether it did. I was at the river frequently during the time that we were operating this system; I owned land on the river bank opposite to it on the flow—the land, and I was over there frequently; I never observed that there was any difference made in the quantity of the water flowing in the river at all.

Cross-examination.

By Mr. DUNN:

I can tell the difference in water in a stream the size of the Los Angeles river, of 30 to 50 inches. I never looked at it with a view of determining that question. Under ordinary circumstances, and

riding over by that river, or standing on the bank of it, whether I would have noticed a difference of 30 or 50 inches, would depend on the amount of water then flowing in the stream. I never noticed anything about it.

(To the COURT:)

I couldn't really say how far this well or pump was from the mouth of the Chavez canyon; it was southeast from the
955 mouth of the Chavez canyon, I should suppose three-quarters of a mile. The pumping grounds were within two or three hundred feet of the Zanja Madre of the city.

(To Mr. CHAPMAN:)

I do not remember definitely whether, when we were running those works, the Zanja Madre had been, before we commenced our operations there—whether that brick conduit had been laid from the Capital mills up for a considerable distance.

(To Mr. WICKS:)

I say I do not remember just when Zanja Madre was made into a cement conduit. It may be a fact that during the time I was running this system down here by Upper Main street, that the waters of Zanja Madre were running in an open ditch. I didn't notice it. I spoke of this point where the pumping plant was located, as there being tules and cienega formation. I never saw any running stream. I had always heard that there was a spring there, but I didn't know of any. There is unquestionably a good deal of water under the street there all through that section. I have never measured the distance of that from the river; it may be three-quarters of a mile. I remember when they built the sewer on Alameda street. I was not interested in the spring at that time, but I know it developed a great deal of water in this sewer—or the sewer developed a great deal of water. I never have noticed the spring since. The hole was filled up and the land was sold out in town lots during the boom.

L. FRIEL, recalled for the defendants in rebuttal, testified substantially as follows:

By Mr. CHAPMAN:

I have made measurements of water in the Los Angeles river, and the Zanja Madre, at different points along the river course here, at about this cross-section, since I was on the witness stand be-
956 fore. I measured the river at the north—where it intersects the north boundary of the city of Los Angeles, and also near this cross-section, about 150 feet below the cross-section as shown upon the map—the lower cross-section; just south of the Southern Pacific bridge going toward San Fernando. And also near the Yuma bridge. Also between the Macy and Aliso Street bridges; and also south of the First Street bridge. The amount of water on March 22nd flowing in the river where it crosses the northern bound-

ary of the city of Los Angeles, was 2,424 miners' inches. At 150 feet south of the cross-section the amount was 2,029 inches. Between those two points there was no diversions being made. The next point in the river that we measured was about 500 feet north of the Yuma bridge; that was upon the 22nd; at that point there was 1,798 inches. Between that point and the cross-section the Zanja Madre was taken out; there were 887 inches taken out in the Santa Madre. There was also coming in from the city water company pipe 613 inches—coming into the Los Angeles river, between those two points of measurement.

The COURT: A gain of 43 inches, Mr. Chapman?

Mr. VARIEL: Between the cross-section and the Yuma bridge.

Witness resumes: I haven't got that figured out—the gain. The next point of measurement was between the Macy and Aliso Street bridges. There was 1,598 inches, between the Macy and Aliso Street bridges. And at a point about 500 feet south of First there were 1,249 inches. That is as far down as I measured it. Upon the 25th and 26th I measured the flow of the river at the city boundary and at this point 150 feet south of the cross-section. On March the 25th at the city boundary there was flowing 2,379 inches. At 150 feet south of the cross-section there were flowing 2,050 inches.
957 Upon March the 26th, at the city boundary there were flowing 2,384 inches. At 150 feet south of this cross-section there were flowing 1,969 inches. There was a diversion on the Chavez ditch, that was being made above the upper point of measurement; above the city line; none between the two. I didn't measure it at any other points on those days; didn't measure the water in the Zanja Madre on either of those days. The Zanja Madre comes out below the cross-section measurement. The diversion commences about a hundred feet or in that neighborhood below the cross-section. There's a long sand diverting dam that diverts the water from the river and then across it down through the flume and from that on into what is known as the Zanja Madre. I could only estimate the length of that flume; the flume proper would be about 500 feet. The conduit this side of the flume I did not observe. It went under the tracks of the Southern Pacific Railroad Company and flows down by the Capital mills. I don't remember when it was constructed.

(To Mr. DUNN:)

The first measurements I made on the same day, on the 22nd. I began at the northern end, at the city limits, about noon, and I finished down at First street about 5.30 or 6.

(To Mr. CHAPMAN:)

The account of the difference in the water in the stream at the cross-section on the first day was 395 inches. This 2,424 is the amount at the city boundary; and the amount at the cross-section was 2,029. My next measurement at the city boundary was 2,379. Upon the first day there was less water turned out of the Chavez

ditch, and then there should be an allowance made for the method of measurement, as it was a surface measurement.

(To the COURT:)

On the 25th, there was a difference of 329 inches, and on the 26th there was a difference of 415 inches.

958 Cross-examination.

By Mr. DUNN:

Those are surface measurements. There were no weirs; they were surface measurements; the cross-section and velocity taken. We have to make an allowance for errors; that is the reason that we made the three measurements. We did not rely upon any one of the measurements. Part of the difference is due to the water being turned in out of the Chavez ditch, and in the measurements. The first time that I know of the Los Angeles river losing anything from its surface flow, excepting by diversion, is at this point between the city limits and this cross-section. This is the first time that I ever measured to obtain it, and I didn't know it before; I find, however, that between the city limits and the point about 150 feet south of this cross-section, according to my measurements, the river loses between three and four hundred inches. I account for that simply because the water disappears from the river and the water is not there to measure at the cross-section. I don't know where it goes. It didn't go along the bank. It certainly must have gone down, and that accounted for the difference.

Redirect examination.

By Mr. CHAPMAN:

There was water that had been brought down by the city water company's conduit and was turned into the river which probably helped to make up the increase below there in my next measurement. I haven't made that calculation to determine whether there was increase over and above that.

F. C. FINKLE, recalled for defendants in rebuttal, testified substantially as follows:

959 By Mr. CHAPMAN:

I have been present in the court-room and heard the testimony of Mr. Eaton, Mr. Koebig, Mr. Schuyler and Mr. Purcell, I think all of it. I heard the testimony of Mr. Purcell as to the manner in which he estimates the rainfall and how he arrives at the run-off. In following out Mr. Purcell's theory here, I didn't have any data on the Verdugo. He gives data in his testimony both on the watershed above the Verdugo and also on the Arroyo Seco, but he doesn't give any information in regard to the Verdugo nor in regard to these other small sheds adjacent the river; so that my estimate is rather incomplete on that account. I have his figures upon the Arroyo

Seco, and the San Fernando basin, exclusive of the Verdugo. Well, it figures up that the Los Angeles river would have to run its full capacity for 13.6 days to carry off that storm of 1884. Mr. Purcell figured that the minimum rainfall regulated the flow of the river, and that all over and above that would run off in flood water; and taking the storm at Van Nuys' ranch in 1884, which is 33.62 inches in depth of rainfall, deducting from that the minimum rainfall at the Van Nuys station, would leave about 32 inches of rainfall over and above the minimum—30 did I state 33? I didn't mean to. Now, that 30-inch rainfall over this watershed would amount to about 50,595 miners' inches continuous flow for the whole year. That is just the San Fernando watershed figured at 460 square miles. Then in the Arroyo Seco—be twenty-six billion gallons of annual run-off—figures up a continuous flow of 5,480 miners' inches for the whole year. These two added together gives about 56,075 miners' inches daily run-off from the Los Angeles watershed every day in the year; or in one day it would be equal to 20,467,375 miners' inches. By computation based on Cutter's formula

960 I determined that the Los Angeles river would carry about a million and a half inches of water. I was taking there for the capacity of the Los Angeles river from the top of the levee running bank full to the top of the levees. I computed it to be 300 feet wide and 10 feet deep, with a grade of 22 feet per mile, that would give me. Then dividing the total flow for 24 hours, during the whole day, by what it would flow, by a million and a half inches, gives 13.6 days which would be required to carry that water off—the storm of 1884. I understood him to state that there was no discharge of storm in the minimum year; that it was all necessary to keep up the flow of the river, the normal flow. I think I have made the same computation upon the testimony of Mr. Schuyler. That computation is also based upon the Arroyo Seco and the San Fernando watershed, excluding Verdugo and all these smaller adjacent sheds. I didn't have any testimony on the Verdugo. From Mr. Schuyler's testimony I find that the storm run-off from the Los Angeles river would be—that is, the San Fernando watershed of about 460 square miles, would amount to a continuous flow of 7,018.8 miners' inches; which would, if all allowed to run off in one day, amount to 2,561,862 miners' inches, under four-inch pressure. The river could carry that off in 1.7 days each year. The river would be full to the tops of its banks every year for 1.7 days. Now, from the Arroyo Seco take 52 billions of gallons, which Mr. Schuyler testified was the flow of the Arroyo Seco, that would make a continuous flow of 10,960.

Mr. DUNN: We object to the statement of the witness that Mr. Schuyler said there was 52 billions, and ask that it be stricken out.

The COURT: Let it be stricken out. You needn't tell what the other witnesses said, just assume the amounts.

961 Witness resumes: I will assume 52 billions flow from the Arroyo Seco, that that would give a continuous flow of 10,960 miners' inches, about. Which, for a whole year—for

one day, if it was all carried off in one day, of 24 hours, would amount to a continuous flow of 4,000,400 miners' inches. Now it would take the Los Angeles river 2.6 days to carry that out, per annum. When I say the banks of the river I mean the top of the levee, as testified to. Then to carry off both the Arroyo Seco and the other would require 1.7 days plus 2.6 days, which would be 4.3 days each year. Now, if the floods should only come once in five years, it would then require 21½ days to carry off this storm water once in five years. Five times what it would in one year. If the run-off of the Arroyo Seco were 26 billion of gallons, exclusive of the ordinary flow, the storm water from the Arroyo Seco would then be just half what I estimated it, which would be 1.3 days instead of 2.6 days; exactly one-half. I haven't made any separate computation on Mr. Koebig's figures as to the run-off; they were about the same as Mr. Eaton's figures, I believe. Taking the figures stated by Mr. Eaton as—the run-off, continuous run-off from the San Fernando basin taken at 8,091 miners' inches continuous flow for the whole year—then the normal run-off of the Verdugo was given as 40 per cent. of the total run-off—while 60 per cent. was allowed for storm run-off. Proportioning 60 to 40 per cent. would give as the run-off of the Verdugo 1,127 miners' inches under a four-inch pressure. The same proportion applied to the Arroyo Seco would give 12,218 miners' inches—would give 2,000 miners' inches for the Arroyo Seco. The total is 12,213 miners' inches, which would be discharged from the Verdugo, the Arroyo Seco and San Fernando shed in storm water during the year. And this, as a continuous flow, running off in one day of 24 hours, would be 4,459,570 miners' inches, or nearly about three days' flow of the river each year; very nearly three days' flow; not quite; I haven't got the rainfall figures here. I say 60 per cent. of the run-off of the Verdugo was storm run-off and 40 per cent. normal run-off; 60 per cent. of the whole run-off is storm run-off. Then I said that 60 per cent. was eleven hundred and odd inches. I was basing that computation upon the fact that 750 inches was given as 40 per cent. of the run-off. I made the 60 per cent. by calculation based on the fact of the 750 inches being 40 per cent. of the run-off. 8,091 inches. 1,127 for the Verdugo, and 2,000 for the Arroyo Seco. My total is 11,213. If that isn't footed up right there is a mistake in addition. I have just the results here; I can correct that in a few minutes and make the computation over. That would then require instead of three days, making the correction of a thousand in addition—which would make in addition I think—make a correction of that error, would make the total run-off in one day as 4,094,470 miners' inches; which would require 27 days to carry off each year.

962

I have looked up the Newell curve quite thoroughly. I consider that the Newell curve would not be applicable to this case, in the way that it has been applied to it at all, because the Newell curve is based upon the measurements of a number of rivers of the water flowing on the surface of those rivers, and is a curve which is platted from those results, to give an average relation existing between the

run-off and the rainfall. That is, the run-off on the surface. Now, if you take a river that has an underflow and apply the Newell curve to the run-off for that, it certainly doesn't take into account anything regarding what that underflow would be, if that watershed were like the watersheds for which the Newell curve was determined. I have seen quite a number of the rivers and some of them I have read about; I think I have seen over half of them. I have seen the Savannah river lots of times. The lower part of the Savannah river
963 flows through an agricultural country; a kind of sandy plain near the coast; and then it finally is a large proportion of rolling country and rolling hills; and finally you get up into the mountains. The country varies. Almost every description of country through what that river flows. There certainly must be a very large underflow in the Savannah river; there are in all those southern rivers that I know anything about. And the experiments or observations there have been confined to the surface flow in all the rivers. I don't think there is a single river which enters into the Newell curve which hasn't got a considerable underflow, and the only measurements taken have been on the surface. I have made a calculation of the amount of water that would pass through a cross-section at the narrows, assuming 17 miles per annum; I didn't make it for 14; it would be some less for that; 17½ miles per annum. The amount of water that would pass through the cross-section of 176,000 square feet, at that rate of velocity, would be 8,506 miners' inches, continuous flow; I didn't make the computation at 14; it would be a little less, about a fifth less, I should think. I can make it in a couple of minutes. I have got the figures upon which the computation of the rainfall was made this morning, which I am not able to give at this time. Those computations were based upon the following rainfalls: Valley rainfall, 15 inches; the foothill rainfall about 19 inches; mountain shed, about 27½ inches; that is the computations I made this morning. I have had experience in the distribution of water for irrigation purposes. I have made a very thorough study of the subject of seepage waters from irrigation, both in my own individual practice in southern California, and also by investigating the reports furnished from other authorities in the arid region, and from those observations I find that
964 somewheres from 25 to 33⅓ per cent. of all the waters used for irrigation will seep back and percolate though the soil towards the water-courses; towards the natural water-courses.

Cross-examination.

By Mr. DUNN:

I found that out by consulting statistics and reports, as well as making measurements of my own. One measurement which I made was the seepage waters from the portion of the mesa which lies a little northwest of the Santa Ana river. Some of the irrigated section adjoins the river. I didn't measure area; I measured the water. The measurements I made were to determine the percentage of the

water used upon the land which would reappear below. The irrigations were those which were made from Lytle creek; and I was called in to make a report and make plans and specifications for the developing of water supply at the foot of the bench along the Santa Ana river. And I made very thorough measurements to determine how much water there was seeping back from those irrigations into the Santa Ana river. The irrigation was made over a territory of from within a half a mile of the river to eight miles back. But my investigation of the seepage waters extended—well, from the opposite slope of the mountain down about two miles, where the last of those seepage waters made their appearance again. They appeared by percolation from the mesa adjoining the river. After running in that way, they would seep into the small depressions and enter the river in the way of streams. I arrived at it in this: I had been acquainted with that river before the seepage waters made their appearance, and there was no water at all at that point. And after those irrigations had been practiced for a number of years, this additional
965 water made its appearance. They commenced practically in '87, to irrigate much up there. I figured it this summer. It has been running for somewheres between 8 and 9 years. The average amount of water which they used on there from Lytle creek at different times has been in the vicinity of a thousand inches, during the irrigating season. They have not used all of that for 9 years; they used less the first few years. I made my estimate on a thousand inches average, which I considered a safe estimate. A thousand inches per year. I don't know how many acres that irrigated. I don't know as I would even state approximately, as I never looked into that. The amount of territory this water was run upon is not material to my computation. I mean any reasonable limits. I can state this, however: That they have water rights which ran from an inch to five, and an inch to ten acres; somewhere along there. If the number of acres it ran on was an unreasonable amount, it might vary the seepage; within the ordinary ratios of water used in southern California, an inch to five or an inch to ten acres, it is about the same proportion, I find. For trees in southern California, irrigation ranges within those limits; there are extreme cases, of course. The locality in which I made those measurements on the Santa river is what is known as Agua Mansa. It is a tract of river-bottom land below Colton. The waters of which I speak from Lytle creek, are practically the only waters used on the mesa above Agua Mansa. I think the last year there have been other waters used there; but that wouldn't enter into my computation because it was subsequently. It was not my understanding that Mr. Purcell testified that during that minimum year the water would practically all go to evaporation and plant life. My understanding of his testimony was that the minimum year was just sufficient to supply plant life, evaporation and normal flow of
966 the river. And I understood that all the water which runs down above the amount of the minimum year, which was three inches and a fraction, went to storm or flood water. I took the flood of '84, and in making up my figures on that amount, I figured

the difference between three inches and a fraction of rainfall on the valley and the amount which actually fell that year, in the valley. And I put that all in run-off for the purpose of making up my thirteen days. I am not stating what the facts are; I am simply stating the basis on which I figured on Mr. Purcell's theory. I am figuring on the basis that everything over three inches and a fraction run off in the storm flood; that is the theory I understood was advanced, and I figured on that basis, entirely, on figuring up that. I was not here in '84, and I didn't see that flood at all. I couldn't tell whether there were any levees built at that time; I know the levees were built since then, because they were built since I came here. I only know from people who told me how much water ran off that winter, that is all. In figuring the number of days it would take to carry the water off, bankfull, I figured from Mr. Purcell's figures as to the mountain shed and the foot-hill shed also. I used everything he used and on his theory; and I made the run-off for the whole winter to be everything above that minimum, for each shed. With the rainfall there in that valley, my opinion is that one-third of the rainfall on the valley would go into percolating water, and two-thirds would go into plant life and evaporation. No matter what the rainfall might be, within the limits that the rain gauges have shown in that valley; taking into account the correct formation of that valley, and the average rainfall as we have it. That is the average result. If you want to ask me about the different years, give me the figures for the year, and I will tell you what I think about it. What portion would run off from the valley in a year when there
967 was 7 or 8 inches of rain fell, would depend of course, on how it fell. I think there has about 7 or 8 inches fallen this year. I don't think any of it run off on the surface. To make an estimate, without figuring on it, I would say possibly a quarter of it would go down to a depth that would aid the percolation. Whatever proportion of it goes to percolation would find its way through this cut or these narrows down here. That is an estimate without figuring on it very close; I haven't figured on such a rainfall as that; I figured on the average rainfall. It is my opinion that a quarter of it would go; that is, in falling in an ordinary manner; that is two inches or something at each storm. If it should fall so that there would be about a quarter of an inch each storm, and distributed that way, there might not be any of it. I think about a quarter of it would go this winter. My figures have been made as to a run-off for a day or a series of days in which there was a great rainfall. I have noticed the Los Angeles river through winters when the rainfall was from 15 to 20 inches. The flow of the Los Angeles river is not materially greater during the 3 or 4 winter months in such a winter, unless just at the time of a storm. A certain amount of water which falls on the Cahuenga hills, and the lower portion here which gets into the river raises it slightly for a short time. It is not any greater, I think, due to the watershed above which we have been considering here for the storm months, than it is in the summer months. But it is a little greater

by reason of these local drainages which go into the river during those small storms. If it is any greater by reason of this watershed, it is so little that you can't observe it. You might detect it by the very finest of measurements. I say that practically the only storm water from this watershed we considered, above the Pomeroy and Hooker land, is during those large
968 storms. In figuring the Arroyo Seco watershed, and figuring the amount which would run off into the Los Angeles river, I took the figures out of the portion of the report of Mr. Purcell which is included in the evidence. My understanding is that a claim was made that those figures were based on a watershed of over a hundred miles; but I don't see how they could have been. I understood the report to say that it is based on a measurement of 100 miles or over; from 100 to 130; prior to Mr. Hall's printed report and map that it was supposed to be that; but since that report of Mr. Hall's, that that idea was done away with. I understood Mr. Schuyler to say that after Mr. Hall's report was issued they found out it was 40 square miles.

Q. Didn't you hear read from that report the statement as follows: "As the mountains through which this stream flows have not yet been surveyed, no information as to the extent of the watershed is obtainable in the United States Government Land Office. However, by careful inspection and calculations as to the positions of the streams lying on the other sides of the divides, I hold that a very conservative estimate will give an area of five square miles per mile of length, or in all 100 square miles. It is but fair to mention that those most familiar with the locality estimate the average width of the shed at 8 miles; which will give a watershed of 160 square miles." Didn't you hear that read from the report in evidence at the time the other was read?

A. I don't remember whether I did or not; but I would like to explain so we will understand each other, Mr. Dunn, if you will allow me to. Well, Mr. Hall's report as State engineer was printed in 1888; Mr. Schuyler assisted to get up the data for that report In fact, I think he said he got up this watershed data. That report shows a watershed of about 17 square miles in the Arroyo Seco above the foot-hill portion, and enough more to make 40 miles below
969 the foot-hill portion. Now this report you have read from the La Sierra Water Company, was made in '90. So I think they must have had the information of the area of that watershed prior to this last report. I heard Mr. Schuyler estate that he figured on 100 to 130 square miles. I can't say I heard him state those figures were made on the estimate of a hundred square miles. I heard him testify to that being forty, and then a hundred square miles. I don't know which he accepted at the time of making this report. If the area of the watershed was not known to be forty square miles at the time, and the figures actually were based upon 100 or 130 square miles, of course that would make a difference. But if the area was known to be forty, I don't see how you could base it on something else. You could base it on a thousand square miles if you wanted to. I don't know that those figures according to that

report, were based on a watershed of 100 to 130 square miles; I heard 140 discussed, and I went and looked it up, and found the Hall report was made two years before this one. I found from the State engineer's report, the watershed was only about 40 square miles. If that is the case it wouldn't change any estimates I have made; it might change the estimates somebody else has made. It wouldn't make any change in the figures I made on the evidence. I don't know of any rivers in southern California that the Newell curve was based upon. No rivers in southern California were used in estimating the Newell curve. I have read Mr. Newell's book that was written on that subject, and I didn't see any mentioned in that. All I have to judge by is that book, which I read by Mr. Newell on the subject. There were none in that book. Originally, I know there weren't any rivers measured in southern California, for the purpose of determining the accuracy of the Newell curve, or for the pur-
970 pose of preparing a basis for it. I think that there has been attempts to make some rivers in southern California conform to the Newell curve, I do not know what the results have been; I never made any such attempt myself. I have compared several times, rivers in southern California with the Newell curve, but not made an attempt. I have compared the Santa Ana river at San Bernardino and down through there to the sea with the Newell curve. I have taken the watershed from others who did measure it. I estimated from that watershed, and taken the run-off by the Newell curve. I have figured on some smaller streams that way. Lytle creek, for instance. Mr. Newell, in preparing this curve, did not take into account underground waters at all. The curve is only taken with reference to the run-off of the surface at the mouth of the canyons, without reference to how much might actually percolate below. That is not taken into consideration, at all. That doesn't change the Newell curve; the Newell curve is all right for what it is intended for. If you apply it in that kind of a condition, it is all right where those conditions exist. The Newell curve is not applicable to a stream that has an underflow, for the purpose of determining the amount of the underflow. In an approximate manner, the Newell curve is applicable to determining the run-off at the mouth of the mountain canyons in any watershed, approximately coming within the limits covered by those curves. But it is not applicable to determining the run-off of such a watershed as this, if you take it down below the San Fernando valley, down by the narrows here—it certainly is not applicable, whatever. The Newell curve would be applicable for determining approximately—I don't say accurately, what might be the run-off on the surface at the mouth of the Tejunga, for instance. The Newell curve is not applicable to the watershed under consideration, which terminates at the
971 east end of the Pomeroy and Hooker land, for determining the storm run-off; neither is it the underflow run-off. I want to know what you mean by run-off; I don't propose to be caught on a little joker somewhere. Do you mean underflow run-off? What I mean by run-off depends on what I say; whether it is underflow, percolating run-off or storm run-off. When I say run-off I mean

everything that runs off, either by percolation, underflow or by storm. The Newell curve is not applicable for determining a watershed like this at all and in general in southern California it is not. There are only a few watersheds that conform to it. It is not applicable to determining the run-off of a watershed like this because it is based upon surface measurements made on the surface, in streams where there is no—where these absorptive basins do not exist between the mountains and the final outlet. It is impossible to know the total run-off in any watershed, without measuring it; and I can't say that I know the total run-off in any watershed. I don't know of but one watershed where the total run-off has ever been determined; and that is only for a few years. That is the Sweetwater at San Diego. It has been determined for about seven years without this year's record. I don't think there was any underflow at Sweetwater; so far as I ever heard there never was any there. I wouldn't be positive about the underflow there, but I should say it is the kind of watershed that wouldn't have any underflow. There may be a little percolating water in some portions of it; but not materially, I think. Whatever there was there would now all be determined since the dam was built. There are some watersheds that have pretty good records, but I haven't got them with me. I am rusty on them; I haven't looked them up. In the northern part of the State there have been some measurements made. I know of where the surface flow has been measured in some
972 of the applications of the Newell curve to those watersheds, that the Newell curve has fitted them tolerably well, although, some others, I know it hasn't fitted at all. In a general way I know the results of the application of the Newell curve to the total run-off of watersheds in the State of California, where it has been able to be compared with actual measurements. I couldn't give you the figures. I know the surface run-off of some branches of the Mojave river has been measured. Deep creek for instance. That only included the surface run-off. I stated that I knew of the Sweetwater. I can't say I know of any other in California where the total run-off is capable of measurement, and where those figures have been applied to the Newell curve. I will state here that the Sweetwater—Mr. Schuyler applied it to the Sweetwater up to 1894–'5. And I believe he claims that it comes very near, there. But there has been one heavy run-off since. I don't know how that might affect it; '94–'5, there was a large run-off at Sweetwater, which raised the average very much. Excluding that heavy run-off year in the Sweetwater, the application of the curve, wherever it was possible to apply it accurately to the total run-off, the underflow and surface flow, has applied, as far as I know. I don't know anything about what that might have done. I never tried it, but I don't think it would check very well. In speaking of underflow, I mean water that percolates under ground, not water that runs in underground channels. Well, there might be such underflows, but I never discovered any. It may exist, but I never happened to discover any, if it does exist. I can't say it is an impossible condition that there might be an underground channel. I don't say such a condition

is impossible, it might exist, somewhere. I do not believe that it exists in southern California rivers, so far as my observations
973 have gone. I think they disprove its existence. It is my opinion that underground channels do not exist under these southern California streams.

Q. Did you in a report dated January 25th, 1892, to the Grapeland irrigation district, report as follows, with reference to the flow of Lytle creek: "In a report on this question to Colonel Hotchkiss, Engineer J. D. Schuyler estimates the probable underflow at 446 inches. This estimate is made on the assumption that there are no large streams of underflow, but that the voids in the sand and gravel comprising the bed of Lytle creek are filled with water. I think this assumption erroneous, and from the facts which I have above cited, I believe that there are considerable streams of underflow, in addition to what percolates through the voids in sand and gravel. Therefore, if 800 inches could be developed by a tunnel costing about $27,000, this would make the cost of the water less than $35 an inch." Did you so report or didn't you?

A. I did so report; but I have since driven a tunnel there and disproved my belief at that time. I since proved by a tunnel that my belief at that time was wrong. I testified that a velocity of 17⅓ miles per year would carry about 8,506 miners' inches through this cut, through this cross-section. I am only acquainted with the material in this cross-section from the evidence given by witnesses here; I heard that evidence. I am only acquainted with the grade at that point in a general way; it is 22 feet per mile, I think. I have no knowledge particularly, as to whether the grade at this point is flatter than it is up above on the Pomeroy and Hooker land; it may be a little flatter. The slope is a minor factor in the percolation of water; it is a very small factor; it has to be radically different to effect the result much. Judging from that experiment, and also from several other authorities, why, I wouldn't think that 17 miles a year would be an unreasonable velocity at all, for the water through this cross-section. I think
974 that would figure more, a little, than 10 feet per hour. According to my authorities it flows faster than 10 or 12 feet an hour. I am speaking about this lower cross-section. Taking the best authorities I could find upon it, why, I don't know, it may flow as high as 20 miles per annum. I don't know without figuring how many feet per hour that would be. I think it would be somewhere in the vicinity of 14 or 15; I wouldn't state though, without figuring it out. That is largely based on other authorities. It is based upon both actual observations which I have made and upon observations made by other authorities, which they have reported to me. I haven't testified to the amount of water flowing at that point, under ground, at all. I have testified to the amount of water flowing under ground opposite the Pomeroy and Hooker land; but that is a good ways above this. My opinion is that water doesn't nearly all go through that cross-section; (indicating on diagram.) I don't think it goes through the cross-section where these wells are bored, the way it is marked on that map. I think there is a cross-

section of the river, if you take it wide enough there and deep enough, that it does carry all the water. I do not think all the water goes down to the exact point occupied by this one cross-section, because there are several miles of porous sandstone between there and the Hooker land, which may absorb a whole lot of water, and percolate off through that. I am of the opinion that there is a considerable amount of water absorbed in porous sandstone on the way down; water percolates through porous sandstone; slowly, though; but it does percolate through it. I am satisfied that not nearly all the underflow ever gets to this cross-section. It percolates off through that sandstone down to lower levels, between the Pomeroy and Hooker land and this cross-section.

975 There are only scattering formations of sandstone in the Big Tejunga, and I think they are all underlaid with granite, when you get deep enough. The formation of the whole western portion of the valley is sandstone; but I think there is granite under it. When you get deep enough down under this, there is granite. Water percolates through granite very little; some might percolate through soft granite. The ordinary name for this sandstone that it percolates though down under the river, would not, I think, be bed rock. Not such sandstone as that. In the strict since of natural bed rock, I don't call sandstone bed rock. I think this water, after it percolates down, makes its way down and supplies these developments below, near the seacoast. I am of the opinion that the water as it comes down through this valley, sinks down through a stratum of sandstone, and gets under the town, down into the valleys below. There might be very little of it go under the town, but I think most of it goes off down adjacent to the town. It goes down somewhere near the Los Angeles river, most of it, I think, at a great depth below the town. The water percolates very slowly, I think, through the sandstone towards the ocean. That sandstone that is brought up from the wells, contains water; and it must come from this percolating water from San Fernando. I think a considerable portion of this water escapes that way. I would say not less than 25 per cent. and not more than 50 per cent. would go off in that way. That is an estimate which I have; just a rough estimate; I haven't looked into the matter very carefully. That has been my theory all the time; all the authorities on geology state that sandstone carries percolating water. I think the water of the San Fernando basin sinks down until it gets to the granite formation. I did not make any allowance for loss of water in that way, when I made my figures on the amount of run-off from this shed. There is no water lost, I think, by such

976 sinking as that. It will come out below, again, I think. It percolates out below somewhere. I don't say just where. It shows water on the Pomeroy and Hooker land 123 feet in depth. It all goes to make up that water, I think.

J. B. LIPPINCOTT, recalled for defendants in rebuttal, testified substantially as follows:

By Mr. CHAPMAN:

There are other places in this State where the rainfall is less by reason of the intervention of mountains between the seashore and the higher elevations, where the rainfall has been kept and measured, to my knowledge. There is one instance of that class in San Joaquin and Sacramento valleys, where the coast range from San Francisco south, or from San Francisco north, intervenes between the inland valleys and the sea, and cuts off a portion of rainfall from the valley rainfall stations. The elevations of the range vary. The summits as I remember, reach a maximum elevation of about 3,000 feet, south of San Francisco for say a distance of 60 miles or 100 miles.

Q. And does that have the effect of lowering the rainfall in the Sacramento and San Joaquin valleys, as compared with San Francisco?

Mr. DUNN: That is objected to on the ground it is incompetent, irrelevant and immaterial, and not proper rebuttal.

Mr. CHAPMAN: I expect to show the effect of the coast range upon that rainfall is exactly as the Cahuenga hills is here with the rainfall at Santa Monica or at Los Angeles.

The COURT: That is conceded by the other side, as I understand it.

Mr. CHAPMAN: That is conceded by the other side. Now then I propose, after showing that factor appears there just the same as it does here, to show that the rainfall of the Sierra Nevada mountains beyond there, measured by the rules which he has evolved
977 here, is exactly, or as near correct as anybody can expect it to be anywhere, notwithstanding the intervention of this coast range that the rainfall at San Francisco is one thing; in Sacramento and Stockton it is another; showing that the coast range has intercepted these saturated winds, and they fall below the rainfall at Sacramento.

Mr. VARIEL (after discussion): The point we are endeavoring to make here is this: First, a general rule is stated by Mr. Lippincott, that the rainfall at the sea level is to be taken as the basis, and that six-tenths of an inch is to be added for each hundred feet in elevation. He adopted that rule in a general way in making his computations upon the mountains and upon the hilly portion of this watershed. He only took the actual rainfall of the San Fernando valley in making his estimate of the rainfall. Now, the question is suggested here on the other side, the Cahuenga range intervenes and we will not take Los Angeles or Santa Monica or the seashore, as Mr. Lippincott did, as our basis for figuring the rainfall in the mountains.

The COURT: I understand that. Just go on with what you want to prove. I understand what has been done.

By Mr. VARIEL:

Q. Well, that this Cahuenga range does not affect the saturated winds above twelve or thirteen hundred feet in height; and all the saturated winds which pass above that altitude strike on those mountain ranges at a point just opposite the upper end of the San Fernando valley. And the result is a deposit on those mountains and on those foot-hills——

The COURT: That is exactly what Mr. Lippincott stated in his examination for the defendant.

Mr. VARIEL: We are proposing then, to show by him, from observations, that such a condition of things exists in the Sacramento valley. As you leave the Sacramento valley there is a rapid
978 gain, and the rainfall from there to the top of the mountains would be just what it would be if the coast range were planed off, and you commenced at the sea and run it right up to those mountains.

Mr. DUNN: There wasn't a word raised or proposition stated, that wasn't exactly gone into in their examination-in-chief.

The COURT: I will sustain the objection. I think it is a reiteration of what they gave in the first part of their case.

By Mr. CHAPMAN:

Q. Is there any other point, Mr. Lippincott, at which observations have been made under the same conditions.

Mr. DUNN: That is objected to on the ground it is incompetent, irrelevant and immaterial; and not proper rebuttal.

The COURT: I will sustain the objection.

H. HAWGOOD, called for defendants in rebuttal, testified substantially as follows:

By Mr. CHAPMAN:

I have resided in Los Angeles since May, 1888; my occupation is civil engineer. I have been engaged in that business about 22 years. I was resident engineer of the Southern Pacific Railroad Company for about 6 or 7 years. I made borings in the Los Angeles river, on their line to Yuma, I think it is called Alhambra avenue, on the city map, the crossing of the Los Angeles river, while I was in the employ of that company. I was boring to ascertain the character of the river bed for the purpose of making bridge foundations. I bored 100 feet. I didn't find any bed rock. I found gravel of various sizes; found water all the way down after the first three feet. I was in the river bed, about a hundred feet from the actual course of the flowing water at that time, I presume. Didn't do any pumping in that well. Sunk three pits for the foundations of the bridge close to this place. One was in the flow of the water-course,
979 one in the middle of the river bed, and one over onto the east side. I found water in all of them. The pit on this side was carried down to 14 feet below water. The middle pit was carried down to 15 feet below water; and the pit on the east end, to 15 feet below

water. I estimate that the largest amount of water that I pumped out of any, which was out of the pit on this side, was between 60 and 70 inches, measured under a four-inch pressure. That was in the river. The river I pushed a little to one side, 10 or 20 feet. I pumped in all the others. They all ran about the same. The point that I made my direct measurement in was in the farthest pit, the one under the east bank. It was made when I was down six feet; and that was an actual measurement. The middle one would be 150 feet, and the farther one would be 340, from the river channel. The quantity pumped out of each of them was about the same, and at about the same rate. When I was doing that pumping it made no impression on the flow of the river that I could notice. I kept the bottom of the pit dry, so that the men could work. That is, when I said dry, there would be an inch or two of water on the gravel. The hole on this side was 29 feet long and 12 feet wide, and 14 feet below water. The middle one was 30 feet long and 13 feet wide, 15 feet below water: 17 feet deep altogether. The one on the east end was 28 feet 4 inches, by 11 feet 6 inches, 15 feet deep; all below water. The material I found in those holes as I sunk them, was gravel, with streaks of cemented material. I built the present Southern Pacific bridge near the cross-section at Buena Vista street. When I was building that I excavated on the south end of the bridge. The bridge I think runs very nearly north and south. Excavated on the south end for masonry abutment. I sunk probably 50 or 60 holes; found a soft sandstone rock. I ceased to hunt for it after I got to 8 feet, I think, was the deepest one below
980 the surface of the water. That would be a matter of about perhaps 30 feet away from the face of the bluff. I sunk no other holes except those on that abutment. I drove piles there besides; a pile foundation. The piles in the main tier run from 38 feet to 47 feet below the surface. In driving those piles I struck nothing that would stop the pile at that time. In the hole that I sunk there, the excavation for the south abutment, I found water; built a cofferdam around it and pumped it out and built foundation down onto the rock. I made no measurement of the pumping rate there. I had the same pump that I had at the lower crossing, the lower bridge. It would throw about 40 inches of water when it was doing its best; I don't think I used its full power at the upper crossing. That was immediately on the bank of the river just jutting out from the bank. One end of the abutment is into the solid rock of the bank. When I was pumping there it did not affect the flow of the river that I could observe, the slightest. I never did any boring anywhere else in the river bed, or sunk any wells.

Cross-examination.

By Mr. DUNN:

I built a cofferdam around this hole at the south abutment. Only the leakage under the bottom of the boards would run into it; that is all. At this other place down below the Yuma bridge where

I made my measurements, I didn't measure the flow of the river, either before or after I began to pump. It extended along from August to December. I made no observations on the flow of the river down there. I know that the river does vary down through the town; but the cause I have never traced up. If it had varied a matter of 40 or 50 inches, or 30 inches, while I was pumping, I think I would have noticed it, because I left a very little space between
981 the edge of the water and the place for the men to stand on to work; if it had raised considerable I should have noticed it, because it would probably have got in on the work. If it should have decreased I wouldn't have paid any attention to it; it wouldn't have interfered with my work at all.

(To the COURT:)

When we pumped the water we threw it out in the stream below. Built a flume for the pumps to discharge into. All the anxiety I had about was whether the water was raising.

WILLIAM MULHOLLAND, called for defendants in rebuttal, sworn and testified substantially as follows:

By Mr. CHAPMAN:

I have lived in Los Angeles 19 years; I am at present superintendent of the Los Angeles City Water Company; have been engaged in the business of civil engineering and hydraulic engineering. That is my business generally now. I have been in the employ of the Los Angeles City Water Company off and on about 17 years. I have been superintendent for 9 years, and in other subordinate capacities prior to that time. During that time I have made observations upon the Los Angeles river, as to the amount of water which was flowing in it; made measurements. I have observed the floods that have occurred since I have been connected with the city water company, in the Los Angeles river. We have had ten floods in the Los Angeles river since '79. I have notes of the time when they occurred; have kept the records of them. I had to overhaul my memory for some of them; but then I had evidence of one kind and another that substantiated my recollection. On September 21st, I was appointed to take charge of the upper end of the Los Angeles City Water Company's ditch—in September, '79. On December the 21st,
982 1879, the river raised and flooded the low lands. Raised in the morning. Subsided, so that in the afternoon I crossed the Los Angeles river at the Tropico crossing; went across there to get some men to assist me to restore the brush dam that was washed out by the flood. The dam was at the head of the water company's ditch. It was a brush affair we had in there to divert the water into the ditch. I know where the Pomeroy and Hooker tract is. I should say that place is about three miles; two and a half or three miles below that tract. December 17, 1880, there was a small rise in the river. Didn't wash the brush dam away. It wasn't sufficiently high for that; that didn't last more than a few hours. The next one was February 17th, 1884. I wasn't working for the water

company at that time, but was employed a day or two after that flood to restore some work they had destroyed. It was a very heavy rise; started in about daylight on Sunday morning. It started to subside the forenoon. The Downey Avenue bridge was washed away in that flood, and also the bridge of Aliso street; a good many houses destroyed on the afternoon of Sunday, when the water was receding. I timed the velocity of the stream in the early morning, about nine o'clock, between the covered bridge at Macy street and Aliso street. There was a man drowned in the river. I timed milk cans coming down the river between—I didn't know the disaster that occurred above. But I timed the milk cans flowing between two bridges with my watch, to determine the velocity of the current. The current there obtained a velocity of 16 miles an hour. That was the heaviest flood I observed up to 1889. That flood subsided nearly all together by nightfall of February 17th, 1884. March 6th, '84, there was a small rise occurred in the early morning. That flood did considerable damage in the river, owing to the unstable condition of the banks left by the prior flood; the heavy
983 flood of February. There was two floods in the spring of '84; January the 20th, '86, was the next one. That didn't last more than a few hours. March 6th, 1884, was the small one. The next one—we didn't have a flood then until '86, January 20th. I didn't observe that rise in the river. I was in Ventura county at the time. It was quite a heavy storm. But I knew the river raised from the fact my brother was doing some work on the river, and he told me of it afterwards. I don't know anything about that storm; how severe it was.

The one day was February the 16th, 1887, we had a rise; quite a violent little rise in the river. It was a very short duration. This flood destroyed a considerable quantity of land between the railroad bridge, on the northeast bank of the river, and the Three-mile house that is on the Glendale road. It started that bank to cutting, and it has been cutting every flood since. That was the first cutting of that bank within my time here. That lasted about four or five hours at its maximum. All these floods subsided very shortly after. They rise very suddenly and take a longer time to subside than they do to rise. January 5th, 1888, had a small freshet. It amounted to probably five or six times the normal flow of the river. Did no damage.

The next one, October the 23rd, '89. We had a heavy rise that occur-ed in the afternoon. I had a dredger working in the river up there at the time, and it drove my men away from their work. It was a very unusual flood, at that time of the year, October. As early as that I have never seen a flood before; never seen any rise in the river. In fact, had never seen any heavy rain. There was seven inches of rain that October. It started in the afternoon about three o'clock and drove my men away from the dredger; drove them ashore there. And it had all gone by Sunday night; nearly
984 all gone. There was probably two or three volumes of the normal summer flow of the river at sundown. Then we had a flood December 24th, 1889. That was the biggest flood I ever saw

in the Los Angeles. That flood washed one of the spans of the Santa Fe bridge. I was present when it fell down. The river started to rise at about nine o'clock at night. My man at the ditch notified me that there was a dangerous rise in the river. I went up there, as is my custom every flood. And I was right there at the reservoir all night. I witnessed the rise of the river up to its maximum, and then the gradual decline of it. It was at its maximum at about two o'clock in the morning. And started to rise probably 9 o'clock. The span of the Santa Fe bridge went off at about 2 o'clock; between half past one and two, in the morning. A log struck the Los Angeles shore end of it and knocked it adrift. The water was then ten feet deep just above the piers of the bridge. The piers of the bridge formed a barrier there. They are not in line with the direction of the current. The water subsided by daylight in the morning. There was about half the volume flowing that appeared then. And that evening, Christmas night, forded the river up on the Los Angeles City Water Company's land.

The next flood, and the last flood, was in '91. We haven't had one since February 21st, '91. That was a very small flood. It lasted a few hours and was all gone by the 22d. At noon there was scarcely any sign of it. I have measured the water in the river below the city water company's present works many times during the last 17 or 18 years; five or six times; both above and below. The quantity of water flowing in Los Angeles river varies, one year with another, up at that point, more I think than it does down at the Southern Pacific bridge, closer to town here. I have measured all the way from 36 cubic feet a second—
985 that is about 1,800 inches—from 1,800 to about 3,000 inches, different years. The lowest water I ever observed there was thirty-six and a quarter cubic feet a second or about 1,800 inches; that was in '89, June, 1889. That was right opposite where the Crystal Springs intake house is. I have never measured it right at the north boundary of the city; I have measured it outside a mile and a half or so above the north boundary. Measured it twice there to make a proper gauging. I have been along there a good many times. There is rather more water at that point now than I have seen many times before, but I have seen as much as there is now, at times, too; varies quite considerably; 25 or 30 per cent. between extremes; probably more than that—40 per cent. That's been the case ever since I have known the river. No worse now than it was 15 or 16 or 17 years ago.

Cross-examination.

By Mr. DUNN:

The rainfall of '87 in this city was about normal; think we had quite a heavy rainfall in '88. The rainfall of '89 was one of the heaviest we ever had. I have never tried to account for the fact that the river was the lowest in June, 1889, that I have ever seen it. It was always a puzzle to me; never did account for it. I have seen 26 inches of rain without a flood in the river, in one

winter. When I have seen the flood and I speak of its receding I don't mean that the flow went immediately down to its normal flow, but within twenty-four hours or less. It is a fact that sometimes after rains the river stays up to possibly double its normal flow for some time. It will stay two or three days. There is never any trouble in putting in a brush dam and diverting it. I have had to observe this river after all these rains, and I would certainly observe if it was more than the normal flow, if it
986 was there. In the summer no more water appears, except at the time of a rain, than in the winter. The summer flow and the winter flow of the river are practically the same after a rain. The difference is not observable. And during all the years that I have known the river, the difference has only been about 30 or 40 per cent., between the extremes in the different years. And for that difference I could make no explanation, in comparison, with rainfalls of immediately previous years. The surface flow is just as liable to be low in the summer after a very heavy wet winter, as it is to be low after a very dry winter. And I never have made that explanation myself.

W. D. LUDLOW, called for defendants in rebuttal, sworn and testified substantially as follows:

By Mr. CHAPMAN:

I reside in Burbank; for the last ten days I have been out on these wells, on Columbus avenue, where they were boring, on the cross-section, or near the Southern Pacific bridge over Buena Vista street. I was at this well No. 2 that was bored by the city at the time that they finished there operations there and quit. I have some of the material that was brought up from that well with the last work that they did; I have got some that was fetched up with the last pump full. I guess that's the last. (Witness produces samples of material referred to.)

Mr. CHAPMAN: We will offer this in evidence. (Showing the same to the jury.) (Same was then marked by the clerk Defendants' Exhibit M. M.) That was the last pump full. I took that out as soon as they brought it to the surface and emptied their pump. There was no work done there after that to my knowledge.

987 Cross-examination.

By Mr. SCOTT:

It was, as near as I can tell, about two o'clock when I got that; maybe ten minutes to two. I can't tell you just exactly what day it was, now. I should judge it was about five days ago, something like that. I was hired to be there by Mr. Friel; I remained there until sometimes as they were tearing down their derrick. I was there from the time they started the well till the end. They only had just to go to their lunch, and of course we got back by the time they started up. When they were told to stop work, I walked down the sidewalk a little ways, and there was blue gums and one thing and another

there, and I stayed there a little while until such time as they had taken down their rods and started to take down their derrick, and I walked down there a few minutes and then a few minutes after I saw them lower their derrick. I took this material out when the last was brought up. I suppose there was other material brought up at that time; but as I say, I picked out a handful of all of the stuff, whatever it might be. It was all of this kind that I picked up and finer sand and like that. I picked up a sample of the material as near as I could. They were down then about 99 feet. I couldn't tell you about the casing exactly, as my wife was sick and I didn't get there till near noon, and another party took the job that morning, and I think they marked up the casing on that, or something like that, and I don't know about it; but I took my measurement from their work-rods. I measured their rods, and then of course I kept track of how far they were down, and how far above the ground. I don't know how far the casing was down. That material is gravel and stone. I couldn't say whether it fell down in the bottom of the well or how it came there. I never bored any wells. They did bring up pieces of boulders. That is what I took them to be, as
988 near as I could tell. They all seemed to think they were, too. They didn't get to anything that stopped them; they wasn't thinking of stopping at all, when they come out. They seemed to be as much surprised as I was. They just had another crew that was going on the night shift; was going to start at 2 o'clock, and they were going right ahead with the well. I don't know why they stopped; they were ordered to they said. The well I am talking about is number 2. It's the second well from the river; the second well that was bored. There were a few little pieces of shale that they brought up. They looked to be broken off—like it might have been in layers, you know; but there was very little of it though—very little of it brought up. I didn't hear anything said there about the bringing up of any hard rock, by those people. I don't know whether or not the casing was several feet above the bottom of the well, at the time they took this material out. They used the sand pump and drill. They brought up the rock and gravel or whatever it was in the sand pump. I couldn't exactly say how many times they used the sand pump in the last hour they were boring, but I should judge about twice or three times. I couldn't say whether they used it about two or three times an hour before that. They might have used it on an average about twice an hour. They didn't get it filled every time. They wouldn't sometimes bring up more than a bucketful. I don't think that they bring up more than a bucket and a half any time. It ran along from a bucket to a bucket and a half full the last few times they used it, I think; and that only occurred about twice an hour. They went faster than that higher up in the well. It seemed to be more gravelly when they got towards the bottom and—of course I don't know whether they would strike a boulder or anything like that. They struck boulders on the way down, and of
989 course it would take them two or three or four hours longer than that on a boulder; and then they would get through it

and then they would have good going again for a little ways. I couldn't say how far they drilled in the last two or three hours. I don't think they pushed their pipe scarcely any. To take marks of it, I would watch on the work-rod—I would judge they went at least something like a foot or fourteen inches; in the last hour I should say. I don't think they went over 18 inches at the outside that morning. They commenced at seven o'clock and quit at 12; in the five hours I think they went about 18 inches. As near as I can tell I think they took up the sand pump about twice in one hour. As near as I could keep track of it they must have raised the sand pump up about ten times. Of course I couldn't say certain. I should say they took up about a bucket or a bucket and a half full each time. Sometimes I don't think they would take up as much as a bucketful. Sometimes I should judge they pulled it up with scarcely anything in it. I couldn't tell you what they pulled it up for. I didn't see anything like that there that I know of. (Indicating Plaintiff's Exhibit 24.) All the way down I seen some sandstone like this (indicating Plaintiff's Exhibit 22). This is sandstone as near as I could tell. I have got a few pieces in my pocket. (Producing same.) You see it is a little different from that. It is not the same material. That is not shale; I can't exactly say what it is. It looks like shale, too. As I say, I have seen a few pieces of shale like that; but I never noticed any at that depth. I didn't notice the boring of any of the other wells, only for a little while on the one well, and they were just starting in there. This well was seven inches. I don't know whether the casing went clear to the bottom. I watched them bore from seven o'clock in the morning until noon, and they went 18 inches in that time as near as I
990 could tell, and they took up about two sand pumps an hour. There was a bucket or a bucket and a half along there in some of them; in some there wasn't scarcely any. I couldn't tell exactly how long it took them to let down that sand pump; quite a little while. It was a hand-power boring apparatus. They used the sand pump to drive the well with. I didn't see the first part of it started, you understand; they were 16 feet deep, I think it was, when I got there; but I saw the last part. They had a drill on several times in the morning, several times during this last five hours; not all the time; they took the drill off and put the sand pump on. I don't know as I know for what purpose. To raise, I suppose, all the material that they had already loosened with the drill; and then they would put the drill back and go on with the drill. Those men seemed to be tending to business, worked steadily, as if they were trying to earn their wages. They kept on as good as anybody could keep on. This whole distance that they went that forenoon was in very much this same kind of material that I have shown here. Some little finer sand, of course, come up with it; there was considerable sand, really; sand and gravel were about even, I should say; sand and gravel is about the main thing.

(To Mr. CHAPMAN:)

I said they were at work there with a hand rig.

W. PUTNEY, called for defendants in rebuttal, sworn and testified substantially as follows:

By Mr. CHAPMAN:

I reside at Florence; have lived in this section of the country about 18 to 20 years; my occupation is well-boring. Have been boring lately for the city up in this cross section, as it is called;
991 bored well number 2, I believe. At the time I quit there the pipe was about down to the bottom of the well. I was employed by the city to do this boring. I received my orders from Pomeroy and Hooker I believe. There is a mistake there. I received my orders from the city. From the city engineer. I had instructions from him to mark the casing as he put it on the pipe. He told me to keep it marked up just so. He didn't say "just so;" he told me to mark it so they wouldn't get onto it how deep I was. By "they wouldn't get onto it" he meant those that was around there watching me; Mr. Ludlow, who was just on the witness stand was there.

Cross-examination.

By Mr. DUNN:

The city engineer gave me these instructions. When he gave them to me I was right at the works. He came there and gave them to me. He is a fair-complected—red beard.

Mr. DUNN: Yes. Stand up Mr. Compton.
(Mr. Compton stood up in view of the witness.)

Witness resumes: This is not the man.

Redirect examination.

By Mr. CHAPMAN:

I do not know the man's name, I have heard it. I don't know Mr. Lownes. I couldn't say whether I have heard of Mr. Lorraine. Nobody else came there and gave me any orders; that's the only order I ever received. The city told me to go there and go to work. I couldn't say the man's name; but it was one of the—surveyors was out there at the time, and was laying off the land. But they showed me the wells to go on. I couldn't say whether the man who gave me the instructions about the casing was among the surveyors that were out there. I don't remember who told me
992 to quit. I had orders to quit. The engineer gave me the orders—the same fellow; and I quit.

D. A. BECK, called for defendants in rebuttal sworn and testified substantially as follows:

By Mr. CHAPMAN:

I have lived in Los Angeles about a year. My occupation is well-drilling. I have been boring wells recently for the city; in the em-

ploy of the city. I continued my operations for the city I guess about a week or a little over. I was boring at this so-called cross-section—railroad bridge, along Columbus street. I bored wells number 4 and number 7 I think. After I quit boring for the city I continued boring further, since; we moved back on number 4, there I was in the employ of Mr. Pomeroy. I had been at work there on number 4 two days. I have got some of the material that I got out of the well since I have been boring there for Messrs. Pomeroy and Hooker. (Witness produces samples of material referred to.) Well, I don't know what you want to do with it; here 'tis. We got that at 127 feet, in well number 4. When we commenced boring for Messrs. Pomeroy and Hooker the well was about 101 feet. We had been boring there about two days; this is the third day. We struck this material about ten o'clock today. The general character of the material that we got from 101 to 127 feet was cemented sand—a streak of cemented sand, and then there was a kind of wash—well, it was pretty near sand rock, but it wasn't sand rock. It was a kind of strata wash. Laid in layers; and then there would be a strata of cemented sand. We found no water to speak of, only it's up—75 feet I think, we went out of the water strata. When we came to this strata of wash that I speak of we found no water in that. It's been that way all along
993 until we struck this stuff; that formation that's here. I have been engaged in the business of well-boring between thirteen and fourteen years in this country. I have had some experience with bed rock. I didn't pronounce this material that I was boring in bed rock We went about a foot, I should judge in this material. We ain't got down in it far enough to show up any water. I wouldn't pronounce any water in it yet; there's some cement in it.

Cross-examination.

By Mr. DUNN:

At 75 feet that we bored for the city we struck a strata of blue sand rock. It was very hard for about 18 inches. Went through that, and I think we went somewhere near about 20 feet into the pure blue cement, with occasional sandstone mixed in with it. It wasn't a sandstone strata, but there was floating sandstone—pieces. Then we struck into this here cemented and—alternate layers of a kind of a float. We went beyond the point, about 26 feet, I should judge, we finished for the city. We have gone now, up to this time, something over 52 feet through these alternate layers of cement and sandstone. We have struck no shale in that well. The first strata of sandstone that we struck laid on an incline; but since that I couldn't tell, it laid on a dip; I don't think it had very much dip, so I couldn't tell whether it was a different dip from the rock strata of the hills. We had to work on that three days before we could get the sand shut off, to get the drill in. I couldn't tell whether it dipped towards the river. I knew it dipped, but I couldn't tell which way it dipped. The pipe was going down—of course I had no further way of telling. It has taken us about 26 hours to bore

this last 27 feet that we have gone. 26 hours, very nearly steadily. We have gone faster than we went in the other when we first struck
994 it; but after we struck the first rock there, of course we went down at the rate of six or seven feet an hour. Right under there was pure cement. This boring has averaged about a foot an hour. In the ordinary sand and gravel of the bed of the river, with our steam drill, we go all the way from one foot to a hundred foot in a day. I couldn't tell exactly how fast we went on an average between the material I call bed rock, in this well, and the top of the ground. I couldn't average it without looking over the time; but I know we did shove in there in one night about 40 feet. There was more than one night we done that. I think there was a couple of nights we run in 40 feet, in the sand. That was 11 or 12 working hours. We have not been working any more rapidly since we were put to work this second time than we were before. We worked steady when we worked. We struck no water that I know of—nothing to speak of. We have been using a sand pump all the time. Sometimes we didn't get up nothing in our sand pump; and sometimes we did; and sometimes we got out a little chunk of rock; and then sometimes we get up some of that stuff; we got that up last. This is the last thing we got up—about a foot of it. We have got an 8-inch hole. When you are in sand, you get up sand. For the last 26 feet it's been cement and some kind of floating stuff. I don't know—it's formed with water. Some of it was kind of mixed up, and then there would be little chunks of it. Of course the most of it didn't come up, when you come to that. It all kind of breaks up. It would mix with the water; it was slush, like. The most of it was powdered up by the drill. Haven't been using any casing since we started for Pomeroy. Have never used any casing since we left the 74-foot level. Had no trouble with it till we struck this stuff. It will all stand, till we struck that. There's water in the well, from above.

995 Redirect examination.

By Mr. CHAPMAN:

There is some sand in this material that we brought up last. It was a kind of water sand—pure sand—where we went 40 feet in a night; no gravel or rock in it. I think it was at a depth of long about 60 feet. Below 50 and between that and 75. Well, it was 40 some odd. It was below 40; 41 or '2, I think it was. That was pretty much all sand. I never bored in that vicinity before, that I was employed by the city upon this occasion. Have bored along in the Los Angeles River bottom, down at Ninth and Santa Fé street. We found a hard strata down there about 260 feet I think. I never saw the material; my brother put down the well; but it was a very hard strata and we had a very hard time getting our pipe through it; that's all I know. We got through it; we are down now about 900 feet. We run back into gravel and boulders after we got down somewheres near about 300 feet I should judge. I guess that extends for about 40 or 60 feet; then we run into hard stuff something

similar to this last I have gone. We ain't through that yet—still a-going. We are down 900 feet and a little over now. There's been considerable of this kind of stuff in the well. It's been up above and below the rock. They had about 40 feet of that second strata and gravel—or rock. That must have been down about 340 or '50 feet. Then we struck it going again, and have been in it ever since; that would be about 550 feet.

By the COURT:

Q. You didn't find any oil in it?

By Mr. DUNN:

Q. Any water in it.

A. No sir.

Witness resumes: There was water in the gravel; that I say was about 350 feet.

(The samples of the material identified by the witness were
996 marked by the clerk Defendants' Exhibit N. N., the same being contained in a tin box or vessel.)

JAMES T. TAYLOR, recalled for defendants in rebuttal, testified substantially as follows:

By Mr. CHAPMAN:

I was with Mr. Friel when the measurements of the Los Angeles river and the Zanja Madre were made here, within the last few days.

Mr. DUNN: If it will aid the testimony we will stipulate he will swear to the same measurements, at the same points, at the same times, that Mr. Friel did. It may save quite a few minutes of——

Mr. CHAPMAN: That is all, Mr. Taylor.

G. O. NEWMAN, recalled in rebuttal, for defendants, testified substantially as follows:

By Mr. CHAPMAN:

I heard the testimony of Mr. Schuyler, Mr. Eaton and Mr. Koebig and Mr. Purcell, concerning their estimates of rainfalls and evaporations and plant life and run-offs. I have made computations upon the result that would follow from Mr. Eaton's testimony concerning this matter—as to the amount of flood run-off that would result from it. At the rainfall of 15 inches, according to Mr. Eaton's testimony, it was 8,091 inches daily run-off or storm water. That would make a flood to the top of the levees, in the Los Angeles river, of 1.9 day. That estimate was based upon the rainfall of 15 inches. Mr. Eaton allowed 60 per cent. of the whole run-off for storm run-off. That 60 per cent. would give extreme flood to top of the levees of 1.9 days, in the Los Angeles river. In that computation I do not take any note of the Verdugo watershed, nor
997 the Arroyo Seco. I can't give you the equivalent of an inch of rainfall, expressed in inches, under a four-inch press-

ure, without the figures to it. On a square mile it is 3.67 inches under four-inch pressure. That is daily run.

I have computed the result upon Mr. Purcell's figures. Mr. Purcell testified that the rainfall at Van Nuys' home ranch was 3.45 inches; and at the flood year of 1894, that it was 33.62 inches; well, I call it 30 inches difference; and that makes a flow of 50,594 miners' inches, under four-inch pressure daily flow for the year. That would make a flood in the Los Angeles river clear to the top of the levees, for 123 days. That is, from the Los Angeles river alone. That doesn't include the Verdugo nor Arroyo watersheds. I have made the same calculation upon Mr. Schuyler's testimony. Mr. Schuyler—that is for 15-inch rainfall, which he took for an average. That would make a flow of 7,018.8 inches per day; equal to a flood up to the top of the levees of 1.7 days. That 8,000 inches that I speak of represented the storm run-off. I can't say that I have measured waters used in irrigation upon a tract of land, in the ordinary methods and quantities that it is used here when they have it, to determine the proportion that enters into the percolating waters and goes into the streams of the country; but I have observed it, and I have read up data from different reports where they have made actual measurements. I observed it in person, both in Agua Mansa, and down at Temescal creek, where the seepage water or percolating water from the irrigated land under the Riverside Water Company's canals, now crops out into Temescal creek. In my opinion about 30 per cent. passes off as percolation. In my opinion there is a greater evaporation from a reservoir than from the surface of a gravel bed or sand bed saturated with water, of equal area.

In my opinion, 8,506.7 inches of water, measured under a
998 four-inch pressure, would pass through the cross-section, so called, here, assuming the materials to be of substantially the same character as those found underneath the soil of the Pomeroy and Hooker tract; and assuming the grade of 22 feet to the mile.

Cross-examination.

By Mr. DUNN:

I said 8,506.7 inches. That is on the theory that the water that flows under there is flowing at the rate of 17.45 miles per year. I surely believe that the water under this ground is flowing so fast in some places. I don't say that it travels so all the way. I think it is places where it travels faster than that, and places where it travels less than that. I could not tell how fast it travels in the fastest places. The 17.45 miles we arrived at by experimenting upon Hooker and Pomeroy's land. I *I* believe it is right. I believe this water has that average velocity under ground, in certain places. It can travel very slow in some places; it stands pretty near still, in some places. Then in some places it has to travel pretty fast; it may be 25 or 30 miles a year. It can travel faster up until it gets up to the velocity of running water on the same level; on the same grade, I think it travel- 35 or 40 miles an hour in some places.

I was at this well number 4 yesterday afternoon, was present when the first gravel was found, and saw the material. That which was presented here was found yesterday morning; but when I was there day before yesterday they ran through a narrow sand streak. There is two pebbles I picked up at 112 feet. (Showing.) I was present personally when that sand pump was drawn, and I see these come out of the sand.

The COURT: Hand them to the jury.

Mr. DUNN: We want them filed as an exhibit.

999 Recross-examination.

By Mr. DUNN:

Very little of that kind of material came out of the sand pump; it was just a narrow streak, and it was taken with some finer sand with it. It was in the afternoon between four and five. I don't know when they started to run; so far as I know they had been running steadily; they were running when I went there. I was there at noon and seen what formation they was in them; they was then in a kind of a cemented place. That was between 12 and one. I got a sample of that; I haven't it here; I can bring it into court during the day. It seems to be quite a bit of it. I don't know just how long they had been in it, but they was in it at noon and they was yet in it when I got back, after dinner and they kept going through that clay until we struck this sand streak; I know I held on to the cable there and felt it and I told them they had struck gravel now. I could feel it by the action of the pump; and this was what they brought up. I could not feel it when they struck just these pieces. That was all the biggest pieces that I could see, and the other was fine stuff. I could feel it when they struck gravel. They only ran in that a short while, and after that they got in that bluish sandstone again. Mr. Beck was not there, this other man was there. If Mr. Beck testified his outfit didn't strike anything else he was certainly mistaken. I was there most of the afternoon. I couldn't tell how many times. They took up the sand pump during that time. They bored four or five feet while I was there. I didn't know the time just when I got there; I went uptown and had lunch and after that came up to the court-room here and left here and went down to the well. I was there about a couple of hours. They was 115 feet when I left there.

I say, 112 feet they struck that little gravel streak. When
1000 I told them they had struck a gravel streak they could feel it. It was just a little of it and then they got into the sandstone; and after that they got through and got into the big gravel. I did not see any stones of this kind come up in the sand pump any other time. There is no such stones in the sandstone. No such stone as this came up in the sand pump at any other time that I know of as long as they were in clay or sandstone, because there is no such stuff in there. It was these two stones and some sand with it. The stuff that did come up was broken-up clay and that sandstone; it is very soft, was in the pump, it mixes with the water and

comes up as a kind of slikens. It pretty nearly all comes up in solution with the water. They were using their sand pump under their rod there; didn't use a drill, at that time; it pumped quite easily with a sand pump; they went down through this with a sand pump. If Mr. Beck says they went through all this with a drill he is mistaken. I have bored or had supervision over boring some, nearly fifty wells, 48 or 49 wells, for the Riverside Water Company in the Santa Ana river bottom, and in most every well we have struck something of this nature. I have never bored through what I would call real sandstone, and I don't call this real sandstone. Real sandstone is older and harder. If this were harder it is made up, in my opinion, in the same way as real sandstone, certainly. Sandstone is a deposit that hardens. The reason this is not sandstone, in my opinion, is because it is not hard enough. I have seen cemented clay between strata of sandstone; most everywheres you find sandstone. If it was real sandstone, I don't know that I have found any stratas of gravel between it. I don't know that I have ever seen any cemented gravel between strata of sandstone; I can't recollect any place. As a geological proposition, I think they do find cemented gravel between strata of sand-
1001 stone. Those little pieces of rocks you show me brought in by Mr. Beck, are granite pebbles. Those pebbles, in my opinion, have been subjected to the action of water. I fixed the percentage yesterday of water which percolated through the soil after being used for irrigation, to become again available, at least 30 per cent. I have not made any observations personally really to measure it; I have only observed, personally, that such a fact existed, that a great deal of the irrigation water finds it- way back to the stream below. I stated yesterday that I had made personal observations on Temescal creek. I made those observations in a piece of land as now belongs to the Riverside Water Company, laying close to Temescal creek, where it in former days was entirely dry, and now it has quite a big spring on it; the spring measured 50 inches when I was there last and seen it. That spring has no name for it; it is right out in the company's field. The source of that spring in my opinion is from the irrigation water; what is put in from the irrigation, about two miles farther up the valley. The first time I seen it, it was I think some time in August last year. They began to irrigate in that valley in '76, farther up in the valley. They begun with a twenty-acre tract and from there it has grown as it has settled up; it has grown further and further down the valley ever since, and is yet. I couldn't make an estimate of the amount they were irrigating in 1880 above this spring, without thinking over the subject more. They are irrigating now between four and five thousand acres. They were not irrigating nearly as much in 1890; last year they put in about 400 acres more. It is pretty hard for me to estimate the amount they were irrigating in 1890, without having time to think of it closer; probably 2 or 3 thousand acres. I can't give you how much for each year, but it has been steadily growing all since '76. The first
1002 I ever saw of this spring was in August of last year, and the first I saw of it it was running 50 inches; I heard of it before,

but I didn't have time to go down there. I don't remember how long before, but I heard the boys down on the ranch there say that it was a spring started there. It didn't start just about as big in the beginning as it was when I measured it; it kept growing bigger and bigger. I couldn't tell how big it started. I don't know how far back of August it started. I know that is when I went there to see it. I couldn't give you the time when I first heard of it; I know I heard of it before spoken of, that there was a spring started there; some time that same year. I am familiar with that territory. I am engineer for the companies that are irrigating in and about that *company*. You know there are other ways that the water can get out, as it undoubtedly has gone, through the Santa Ana river, because the Santa Ana river lays one side of this tract of land and Temescal creek on the other.

It is my opinion this spring was caused by the irrigating waters on the valley above it. As I say I don't say that all the water goes in that direction, because some of it undoubtedly finds its way into the Santa Ana river. It has been increasing constantly for twenty years, it just come to the surface at this point within a comparatively short time to the amount of 50 inches in one spot; that is now why, down at the Temescal wash, where it came out, and there was there the irrigated land, there is quite a big tract of land, several hundred acres, that has changed from being—well, the wells was bored there in '75, and there was 60 feet of water, and now there is several hundred acres as have turned into a tule marsh. In figuring on Mr. Purcell's rainfall and run-off, and making my figures for the amount of time it would take the river to carry that off, I took what he stated;

three inches and a fraction. And then I figured that the
1003 difference between that three inches and a fraction and the whole forty odd inches fall in '84 all went down the river, because he says all above the normal rainfall goes off in flood water. I worked upon the basis that he did say that.

Redirect examination.

By Mr. CHAPMAN:

I was down there at this pump day before yesterday. I saw the stuff that was coming up there then. I tried that with my pocket-knife to see whether I could cut it or not. It cuts very easily. It is just like fine clay. It leaves a very smooth surface when you cut it; just like a piece of glass. It is more sand in this speciment, Exhibits 7 and 22, than in some specimens that were brought up there that I haven't got with me. Exhibit 22 has the most clay in it.

(To Mr. DUNN:)

I can cut either one of those with my knife now; you can cut it very freely when it first comes out of the water; but still it has not as much grit in as in those specimens; it is a kind of silt deposit, and cemented together and got a little hard; some water in it. How far the water travels through it I couldn't tell you; there is lots of

water in it; it is soaked with water. In a well I shouldn't be a bit surprised if it would be enough water coming out of that stone, that is, for a small family; a family of four or five, anyway. We have lots of wells sunk in rotten granite in this country that supplied a pretty good family.

Mr. CHAPMAN: Mr. Dunn yesterday we agreed before the clerk to have the memorandum, made by the Signal Service office, of the rainfall at Santa Monica, and the rainfall in this city on January 27th and 28th filed here in evidence, with like effect as if he had been here to give it to us.

Mr. DUNN: Yes, sir.

1004 Mr. CHAPMAN: I would like to have that stipulation entered in the reporter's notes.

Mr. DUNN: Yes sir, it is so stipulated; that is, that one you showed me; I don't want anything else.

And thereupon the memorandum of the rainfall at Santa Monica for the years 1889–1894, inclusive, and on the 27th and 28th days of January, 1896, in Los Angeles, was filed in evidence, of which the following is a copy:

"Department of Agriculture, Weather Bureau, office of the observer.

(Station) LOS ANGELES, (Date) *March* 27, 1896.

Mr. John G. North, Los Angeles, Cal.

SIR: The rainfall data requested in your letter of the above date is as follows:

"Rainfall at Santa Monica, Cal., obtained from the publication of the Weather Bureau, for the years 1886 to 1894, inclusive. 1886, 10.47; 1887, 15.76; 1888, 26.09; 1889, 29.65; 1890, 9.32; 1891, 15.68; 1892, 16.28; 1893, 19.25; 1894, 6.73.

"The rainfall on the 27th and 28th days of January, 1986, was 1.28 and $\frac{45}{100}$ of an inch respectively at Los Angeles city.

"Very respectfully, GEORGE E. FRANKLIN,

"*Observer, Weather Bureau.*"

M. J. LORRAINE, recalled for plaintiff in surrebuttal, testified substantially as follows:

By Mr. DUNN:

I have been sworn. I was in charge of this well No. 4, driven for the city, part of the way down. And I testified the material it was being driven in. The well-boring outfit stopped a couple of times while I was on duty. They stopped one time about an hour, and another time about half an hour. I was there when they

1005 stopped. The first thing they did after they stopped and were going to work, they would set the sand pump to work, for the purpose of taking out the debris in the bottom of the well. When they set that sand pump to work, after having stopped and sent down the sand pump, they got gravel in it. It was material similar to that in this bucket; Defendants' Exhibit N. N. The way

that material happened to be in the bottom of the well after they had stopped, it run in under the casing. The casing stopped at the sandstone, and from there the well was not cased. One side of the casing rests on the sandstone. That sandstone sits at an incline probably 30 or 40 degrees, I should judge, and it wouldn't be possible for the bottom of the pipe to be clean so as to shut out sand and gravel from the river. Each time they stopped they would bring up gravel first. They would take up a full sand pump full; full to the top. That is a good deal more than there is in this can. I was there some little time and they weren't working while I was there. I was there about an hour and a half yesterday morning.

Mr. DUNN: Now I think, Mr. Chapman, that your own witness testified that they stopped boring at ten o'clock and didn't drive the sand pump down until two. If that is not a fact, it will necessitate putting on another witness.

Mr. CHAPMAN: Whether he swore to it or not, they stopped work there yesterday morning at ten o'clock, for some little time, and never did go to work again, until we sent down there and started them down to work. I don't know whether it was two o'clock or not.

Mr. DUNN: And they didn't go to work until the time when this sand pump was driven down for this material, did they?

Mr. CHAPMAN: That material, as I understand it, they got that all the time pretty much, until they quit work yesterday
1006 afternoon. I know there was a period there of two or three or four hours that they didn't work. They stopped work and didn't intend to work any more at all.

Witness resumes: I was not there when they put the sand pump and got this material.

Cross-examination.

By Mr. CHAPMAN:

I was there, I should judge, about an hour and a half in the morning; also yesterday afternoon. I think I went there some time before ten o'clock or about ten o'clock; I don't know the exact time. It was about noon when I got home. I went back in the afternoon; arrived there probably about three o'clock or a little before three. They were not at work then. I remained there until 5 o'clock or a little after. I understand they had been working there just before I got there.

HOMER HAMLIN, called for plaintiff in surrebuttal, sworn and testified substantially as follows:

By Mr. DUNN:

I was not present at this well number 4 yesterday morning, when the borers there stopped running the well, stopped boring. I first went to the well about ten o'clock; they were not boring then. I stayed there constantly; right there in the vicinity, until 5 in the

afternoon. They didn't do any drilling from the time I went there until I went away. They took up three sand pumps partly full of material, about half past two. Then the well had stood, to my personal knowledge, from ten o'clock until half past two, before they took this up.

Cross-examination.

By Mr. CHAPMAN:

1007 I was sent there by the city engineer, to watch. I had not been engaged in that business before; had not been employed by the city before at all.

I don't know whether the casing was put down in that well to the bottom of it; I wasn't there, sir; I was not there when the city quit work. I hadn't been there before, to watch the well. I didn't time the length of time they were working with the sand pump after I got there. It might have been half an hour. I don't think they sunk the hole but a few inches while I was there. I think about eight inches. I noticed the rope that they had. A piece of rope wound around the wire cable attached to the sand pump. It is an eight-inch well, I think. The last material that came out was rather coarse sand. Very little else in it.

EDWARD LOWNES, recalled for plaintiff in surrebuttal, testified substantially as follows:

By Mr. DUNN:

The specimen which I hold in my hand now came from the hill just above the Zanja Madre tunnel; the mouth of it; bed rock in the hill. This specimen was between two strata of sandstone. It was in the bed rock of the hill. That is right near well number 1.

(Article referred to filed in evidence as Plaintiff's Exhibit 30.)

Cross-examination.

By Mr. CHAPMAN:

190 feet, about, in a westerly direction.

Mr. DUNN: We will rest.

The COURT (after argument as to which party should have
1008 the opening and closing in the argument to the jury): I will allow the defendants to open and close the argument.

The exhibits of the materials taken from the bottom of the wells are unnecessary to the presentation of this cause on the motion for a new trial, or on appeal.

The evidence being closed and argument of the counsel, the court, of its own motion, gave to the jury the following instructions:

1.

*Instructions as Given.*

GENTLEMEN OF THE JURY: This is an action whereby the plaintiff seeks to condemn for public use all the right, title, interest and es-

tate of the defendants in the lands described in the complaint. The land is situated in and on each side of the Los Angeles river several miles above and north of the city of Los Angeles. The questions arising in the case involving the right of the plaintiff to condemn the property and the nature and extent of the defendants' estate and interest in the land to be taken has been determined by the court. The only question you are to decide is the amount of compensation which the defendants are entitled to before their estate and interest in the land can be taken as proposed.

2.

This compensation is to be composed of two parts or elements; first, the value of the interest and estate of the defendants in the land described in the complaint; second, the amount of the damages which will accrue to the other land of the defendants, which is a part of the same parcel as the land to be ta[illegible], by reason of the severance of the land to be condemned, and the construction
1009 of the works thereon, as proposed by the plaintiff. For the purpose of assessing this compensation and damages the right is deemed to have accrued at the date of the summons, which was June 27, 1893, and the actual value at that date is the measure of value for all property taken and the basis of damages for all property injuriously affected.

3.

The defendants' estate in the lands in controversy is an estate in fee-simple, but it is subject to the rights of the city of Los Angeles in the waters of the Los Angeles river. This river flows through the land to be condemned. If the city of Los Angeles had no interest in the river waters, then the defendants would have all the rights of riparian proprietors in those waters. As it is, their rights as riparian proprietors are impaired and diminished to the extent that the rights of the city affect those rights.

4.

The city of Los Angeles is situated on the river below these lands and is the owner of the right to take from the Los Angeles river all the water that is reasonably necessary to give an ample supply for the use of its inhabitants, and for all municipal uses and purposes for which the city may require water. This right is measured by the necessity and if the needs increase in the future, the right will expand to include all that the needs require. This right of the city is paramount and superior to the rights of the defendants in the waters of the river.

5.

The defendants, therefore, have no right to so use or divert
1010 the water of the river as to diminish the same so that it will not furnish the amount needed for the supply of the city aforesaid, and in determining the value of the land to be taken, this fact must be considered, and the value of the land for which defend-

ants are entitled to compensation, is its value, subject to the above-stated right of the city.

6.

After the wants of the city are supplied, however, the defendants have the right to use the water of the river on their lands for any and every purpose which does not interfere with the equal rights or injure the lands of other riparian proprietors along the river above and below this land. These rights include a reasonable use of the water of the river on the land for irrigation, domestic purposes, watering stock or other lawful purposes; also to obtain power by means of the fall of the stream on the land, returning the water to the stream before it leaves the land; also the benefit of having the water flow in its accustomed manner through the land. The right to use the water to irrigate the land through which it runs is subject to the condition that other riparian owners along the stream have the same right, and, if the water is not sufficient for all, neither has a right to use more than his reasonable share. All these rights are incident to the land because the river borders on the land; and they are not mere appurtenances, but are part and parcel of the land itself.

7.

In exercising this riparian right the defendants have no right to carry any of the waters of the Los Angeles river off of their riparian land for use on land not riparian, nor can they sell it for use on land not riparian; and all surplus water must be turned back into the stream.

1011

8.

Rights in a subterranean water-course or stream are governed by the same rules as a surface stream of water; and the only rights that the defendants, as owners of the lands sought to be condemned would have in any subterranean water-course flowing through their lands down to and through the lands of others, (whether said stream flowed on such lower lands above the surface or beneath the surface of the ground), would be to make the same, but no other use, that they would be entitled to make had such waters flowed on the surface.

9.

A riparian proprietor is not entitled to divert (for any purpose except for purposes for which he is entitled to make use of on his riparian lands as specified in these instructions), any portion of the waters of a water-course, or stream, whether surface or subterranean; and he cannot by any indirect means, make such diversion where he would not have been authorized to do so directly.

Therefore, a riparian proprietor cannot by sinking tunnels, or making other excavations, under the sides or underneath the bed of such water-course, draw away for use on non-riparian lands any of the waters flowing in such water-course, although said excavations may not directly touch said stream; if, for instance, the water of

such stream percolates into the banks or bed thereof to a considerable but limited distance, and such percolating water is stationary, or has very little motion, said riparian proprietor would have no right to make an excavation so as to draw off said percolating water, if the effect would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were
1012 drawn by such excavations, any more than if said excavation was made so as to tap said stream directly.

10.

The mere fact that some of the subterranean water forming part of the stream on the lands sought to be condemned may be lost before reaching the point where the same would have gone into and made up a part of the surface or subterranean stream of the Los Angeles river, would not give the defendants the right to divert an amount of said subterranean waters in said lands equal to or less than the amount so lost, if such diversion would have the effect of diminishing the waters, surface or subterranean, of the said river at any point above the south line of the pueblo lands of the city of Los Angeles.

11.

Whatever additional market value the land may have had by reason of these rights and advantages, so far as they do not interfere with or impair the rights of the city aforesaid, this value the defendants are entitled to, as a part of the value of the land, before it can be taken; and this value you must include in your estimate of the value of the land sought to be condemned.

12.

In addition to these rights and benefits arising from the flow of the river through this land, the defendants are the absolute owners of all such water as may be present in the soil of this land, and which does not constitute a part of the water of the river. This is usually called percolating water. There is, however, no magic in the word "percolating," and the fact that any witness may
1013 apply that word or refuse to apply it to any particular class of waters of which he may speak is not conclusive of the question whether or not such water does or does not form part of the river. That question is to be determined by you from a consideration of the facts proven. The right and ownership of the defendants in this class of waters is distinct from and much greater than their right to the waters of the stream. As to the waters of the stream, they have a right only to the use of it on this land; and they do not own its corpus, its body or the very water itself and they have no right to take it away from the land and use it on other lands, or to sell or dispose of it for use on other lands or at other places. But as to this other water, if any there be, in this land, not a part of the stream, they are the absolute owners of it, to the same extent and as fully as they own the soil, or the rocks or timber on

the land. Therefore, if, by any means, they can separate this water from the land, they have an absolute right to the water thus separated, and may conduct it away and sell or dispose of it anywhere, as they see fit, subject only to the limitation that they may not excavate or do anything on the land for the mere purpose of intercepting such water and preventing it from flowing into the stream or water-course on the land of another, and without intending to make any beneficial use of it themselves. Whatever additional market value this land may have had by reason of the presence therein of water of this class, or by reason of the feasibility of separating it from the land or of using it on the land, or of conducting it to some other place for use or sale, or of the great market value of such water for such purposes, or by reason of all these things combined, or by reason of any other lawful benefit or advantage which this water gives, this additional market value inures to the benefit of the defendants, and is a part of the compensation to which
1014 they are entitled in this case as the value of the land to be condemned.

13.

It will be necessary, therefore, for you to determine what waters upon or in this land are a part of the waters of the stream and what waters are not of the waters of the stream. This question is a question of fact to be determined by you from the evidence under the instruction of the court.

14.

The Los Angeles river is composed of its main stream and any branches it may have, whether surface or subterranean.

15.

While a water-course must have a bed and banks or sides, yet such bed may consist of any material which keeps the waters from penetrating below a certain depth, and such banks or sides may consist of any material which has the effect of confining the waters within circumscribed limits.

16.

It does not always follow that water which does not flow on the surface in a visible stream is, for that reason, not a water-course, or not a part of the water of a stream which does at some place run on the surface; nor need it flow in a defined channel under ground as a solid body of moving water of any particular demensions in order to constitute a water-course.

If you find from the evidence that there is a bed or river bottom filled to a considerable depth with sand, gravel or other por-
1015 ous material, meandering over which a stream runs on the surface and through and in which the water moves under ground, enough of it rising to the surface to supply the surface stream, and the other portions of the underground water moving with a much less velocity than the surface stream, and through a

wider or larger space in and through the interstices of the porous material, but in the same general direction as the surface stream and in connection with it, and in a course and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy, then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface.

If such a water-course exists, it is immaterial, so far as the water-course is concerned from or through what lands the waters flow in reaching the channel or whether they reach the same by percolation or by clearly defined streams.

17.

So, also, if you find that the water coming down on the surface in the streams known as the Tejunga, Little Tejunga and Pacoima creeks, in the northeastern portion of the watershed it is discharged on the plain known as the San Fernando basin, and there sinks in the sand washes and flows down southwardly under ground through sand, gravel or other material easily permeable by water and along the courses and it- channels which have been made by the streams of water from those same creeks flowing on the surface, but which channels were long ago filled up with this porous material; that these waters now flow in these channels beneath the surface to the land in controversy; that on this land there is a range of
1016 hills extending easterly and westerly, so as to change the course of these underground channels, and combine or collect the water into one general body of water, and force the same to turn and move eastwardly in a similar channel through these lands and on down along the general course of the Los Angeles river. That upon arriving at this land a portion of the water rises to the surface and flows above ground as the Los Angeles river, and the remainder flows under ground along in the same general direction, and in connection with the surface stream, in porous material formerly deposited by the same stream in its bed, then all this body of water, both above and below the ground should be deemed a part of the same stream from its sources to its outlet.

18.

If the jury find that on the lands sought to be condemned there is situated the river bottom of the Los Angeles river extending the whole length of said land, and occupying nearly the whole thereof, and containing all the subterranean waters of said land, and filled to a considerable depth with permeable material, consisting of loam, sand, gravel and boulders, mixed together and interspersed with irregular and broken strata, masses or pockets of clay, and cemented sand or gravel lying in place substantially as deposited by the forces of nature; and that as the same lies in place the natural voids or interstices of such material generally throughout the whole of said river bottom are equal to from one-fifth to one third of the entire mass; and that the subterranean waters in said

lands enter the same chiefly from the north and partly from the west sides thereof from lands composed of substantially the same materials as the lands sought to be condemned said waters so entering under pressure caused by gravity; and that the south boundary of said river bottom is formed
1017 of an impermeable dyke of rock known as the Cahuenga hills; and said waters entering from said north side are prevented from continuing their flow to the south, and are dammed up by said wall of rock, and that all of the subterranean waters in said river bottom are thereby forced to fill all of the said interstices and void places in the material of which said river bottom is composed to a height in some places equal to and in some places greater than the level of the surface stream of the river; and that there are no impenetrable and continuous barriers extending through the said mass in said river bottom in any direction so as to interrupt and prevent the substantial continuity and contact of all of said subterranean waters; and that some of said subterranean waters to the amount of about 1,000 miners' inches, constant flow, measured under a four-inch pressure, being so brought to the surface, enter into and form part of the surface stream of the Los Angeles river on said lands, so that the amount of said surface flow at the point where the same leaves said land on the east is increased by about 1,000 inches over the amount of its surface flow at the point where it enters said land on the west; and that the remainder of said subterranean waters move under ground to the east although with a varying velocity and much slower than the said surface stream, but in the same general direction with it, off of the lands sought to be condemned, still continuing in and through the river bottom of the Los Angeles river, which is composed of like permeable material as aforesaid, and bounded and confined on the southerly, and as it turns to the south, on the westerly side thereof by the same continuous dyke of rock, said waters still maintaining their substantial continuity; and that part of said waters rise from time to time as they flow in said river bottom and feed the surface flow of said river; and the remainder of said waters continue to move under ground in said
1018 river bottom as aforesaid; and that said waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom enters within the limits of the city of Los Angeles, crossing its northern boundary, then the jury must find that all of the subterranean waters contained in the land sought to be condemned, are a part of the waters of the Los Angeles river.

19.

On the other hand, the law is that innumerable little streams finding their way through the soil, or seeping or percolating through the material of which it it composed, do not become water-courses simply because the amount, when exposed, is visible.

A water-course, must consist of beds, banks or sides, and water, and the water must be flowing in a channel or course more or less defined. It is not necessary that the water should flow continually

or at all times of the year, but neither is a mere swale, in which extraordinary freshets flow, sufficient to answer the definition. To maintain the right to a water-course or brook, it must be made to appear that the water usually flows in a certain direction, and in a regular channel, with banks or sides though it need not be in a straight line.

Waters, whether under or above ground, having no certain general course or definite limits, such as those merely percolating through the strata of the earth and those diffused over its surface, are not water-courses and are not subject to the rules of law applicable to water-courses.

To entitle an underground stream to the consideration of the law, it is necessary that it be a water-course in the proper sense of the term. Percolations which spread themselves in every direction through the earth do not constitute water-courses.

1019 Water moving by force of gravity in a valley or basin of wide extent, say 24 by 12 miles at the extreme extent, and moving generally through the whole or through a large portion of the basin, along through the natural voids or interstices of the earth, composed of alluvial or other deposit lying throughout the entire basin, and made up of loam, sand, gravel and boulders mixed together, and interspersed with irregular and broken strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, do not constitute a water-course, but are a part of the land and belong to the owner of the land as fully as any other constitute part of it.

20.

If you find from the evidence that the lands sought to be condemned are situated at the lower portion of and form a part of the San Fernando basin, or watershed, near or at its outlet, and that said basin is about 24 miles long and about 12 miles wide at the widest point; and that said outlet is from two thousand feet to three miles wide, and bounded and defined on the southern side by the rock of the Cahuenga range and on its northern side by similar rock of the Verdugo hills, and that the earth of which the basin is generally composed, including said outlet and the land sought to be condemned is an alluvial or other deposit made up of loam, sand, gravel and boulders mixed together and interspersed with broken or irregular strata or masses of clay or cemented sand and gravel and lying in place as originally deposited by the forces of nature, and that as the same lies in place, the natural voids or interstices of such earth, generally throughout the basin, including the defendants' lands and said outlet, are equal to from one-fifth to one-third of the bulk of the entire mass, and that such entire deposit lies upon a grade

1020 or slope toward and through the outlet of such basin, and that all the water falling in the watershed of said basin which is not lost in storm run-off or by evaporation or in supporting plant life, or held immovable in the ground, sinks into the earth composing such basin and thence by force of gravity moves down through such voids or natural interstices of the earth throughout the greater

portion of the entire mass, to the outlet of the basin, through which it passes, without forming anywhere in the mass any definite course or channel in which it can be ascertain- with reasonable accuracy that such water is moving in greater quantities or with greater velocity than in other places, so as to be concentrated in a stream either above or below ground, then such waters so moving through such outlet, or through or in defendants' land in the natural voids or interstices of the earth, do not constitute a subterranean flowing stream or water-course, but they belong to the owner of the soil in which they may be found, and the portion- of them which may be found in the land of the defendants are the property of the defendants. But if such waters does collect under ground and flow in certain courses or channels through coarse, permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface and although the space through which the channel extends may be largely filled with the material through which the water flows.

The burden of proving that waters moving in the ground are flowing in a natural water-course, or in a defined channel, or are a part of a stream, is upon the plaintiff in this action. The presumption is that they are not part of a stream or water-course nor flowing in a definite channel.

1021 21.

A stream which flows along and in a natural channel, at some places flowing on the surface, and at some places sinking in porous material which has been deposited in and has filled the channel, and there passing down along in the same channel under ground and again rising to the surface and flowing as a surface stream, is no less a stream or water-course at the points where it flows under the surface than at the places where it runs on the surface. And if a part of the water remains moving under ground at the places where the surface stream flows, all of the water, both above and below the surface, constitutes the stream. And if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material forming the semblance of an underground lake or reservoir with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel and afterwards reappearing below as a surface stream, then the water would be as much a part of the stream while it was contained in such underground lake or widened channel as while it was flowing on the surface.

And, on the other hand, water which has not formed part of such a stream and is not moving in such underground channel, but comes from surface water or from rains and floods sinking in the ground and passing through the soil by gravitation, having no general direction, although it may eventually find its way into some stream or water-course and materially add to the waters thereof, yet while

so passing through the ground it is not a stream or water-course, but is part of the soil and is the property of the owner thereof.

22.

1022 In determining the actual value of the land taken, you are to take into consideration all of those factors which enter into and make up its value; the altitude of the tract, the capability of taking to the city of Los Angeles and to the country east and west of it, by gravity, the waters which may be collected on said land without taking the waters of the natural stream; the amount of water which can be thus collected; the fact that the land sought to be condemned is so situated as to constitute the best place along the Los Angeles river for obtaining a water supply and conducting the same either to the city or other tracts east and west of it; the needs of water in different places within reach of this tract of land and of the water which may be thus collected thereon; all are circumstances to be considered by you in determining its actual value.

23.

If the jury believe from the evidence that the subterranean waters in the land sought to be condemned are percolating without any definite channel, and that the same are not a subterranean water-course or stream; and if they believe that such waters come onto said lands from the lands of others above, or pass from the lands sought to be condemned down to the lands of others lying below, and that such upper proprietors could, by the construction of tunnels or other works, cut off or divert said waters, or some part thereof, from the lands sought to be condemned, or that such lower proprietors could construct tunnels or other works on the lands lying below the lands sought to be condemned, which would have the effect of draining or depriving the lands sought to be condemned of their subterranean waters, to the extent that the owners of the land sought to be condemned could not make a practical use thereof, or of some part of said waters, then the jury are instructed that
1023 such upper and lower proprietors would have the same rights so to appropriate said waters on their lands as the defendants would have on the lands sought to be condemned, and the jury must take those facts into consideration so far as they diminish or destroy the value of the rights of the defendants to said waters, or such portion thereof, as could be so diverted or drained so as to deprive defendants of the practical use thereof.

24.

In estimating the value of the riparian right of the defendants to utilize the flow of the river for generation of power, you are instructed that the water so used must be both taken from and returned to the river at points situated on the land sought to be condemned; that no speculative valuation can be entertained by you; that you are authorized to take into consideration the cost of constructing and maintaining the works necessary to develop and utilize the power and the difficulty, if any, of permanently maintain-

ing and operating said works, in view of the location of the lands and the floods and the freshets, if any, to which the flow of the water in the river is subject; that such right is subject to the paramount right of the city to use and control the whole of said waters so far as needed for the use of its inhabitants; and that if the jury find that the actual market value of the naked land at the time of the issuing of the summons was not increased by reason of the existence of this right, they must not take it into account in fixing the amount of compensation.

25.

In determining the actual value at the date of the summons you are not to take, as the measure of that value, what an owner
1024 could realize at a forced sale, but the price he could obtain after reasonable and ample time, such as would ordinarily be taken by an owner to make sale of like property; and in making that estimate you should consider the use for which the property is suitable, having regard to the existing business or wants of the community, or such as might have been reasonably expected in the immediate future. You will also consider the fitness of this land for agriculture and its value for that purpose, and for fruit or stock raising, for the timber growing on it, as well as the water which may be in the soil, not a part of the river, and from these and all other uses to which the water may be put from which profit may be derived, and from all the evidence on the subject, you will determine its actual market value at that date.

26.

The market value of the land is not necessarily the value of the land in its present or prospective use to the owner; nor is it the value which it would be to the city as a location for headworks; nor the sum which the city might be compelled to give for it by reason of the necessity it may be under to obtain it; nor is it the sum that could be derived from the land for any special purpose for which it may be suitable; all these things, if shown by the evidence may be considered as bearing on the question, but only so far as it may appear that they affect the actual market value at the date of the summons, and the thing you are to determine is such actual market value at the date stated.

27.

Although you may believe from the evidence that by reason of things done, discovered or ascertained since June 27, 1893, it
1025 now appears that the land was then more valuable for any purpose or use than it was then known to be, yet you cannot consider such additional value, unless you believe also that these things were sufficiently known or obvious in June, 1893, to affect the market value at that time and did so affect it.

28.

If the jury find that any of the underground waters of the lands sought to be condemned are not a part of the waters of the Los Angeles river, they can consider that fact in fixing compensation only so far as it tended, if at all, to affect the actual market value of the land at the date of issuing the summons disregarding any acts done upon the lands or information acquired concerning said waters since said date.

29.

You are entitled to consider the evidence regarding the quantity of subterranean waters in the lands in question, and their value, only in arriving at a just determination of the market value of the lands sought to be condemned on the 27th day of June, 1893. Wherefore, if you believe that said waters did not give said lands an additional market value at that date, or that if an additional market value were given, but the same did not equal the real value of said waters, then you must place on said lands a valuation equal only to the market value which they then had, including such additional market value which said waters gave to said lands, irrespective of the true value of said waters.

If, for instance, said lands could not have been sold in the market on said date (the owners having had abundant time to find a purchaser, such as would generally be taken by an owner trying to sell like property,) for more than a certain sum, then you must
1026 not find the value of said lands to be greater than said sum, although in fact you may believe that the waters in said lands made them worth more than that sum.

30.

If you find from the evidence that the tract sought to be condemned, is part of a larger tract belonging to the defendants and that this larger tract will be damaged by the severance from it of the tract sought to be condemned and applying it to the uses proposed, then you must determine the amount which the remainder of the entire tract, the part not taken, will be damaged.

31.

In estimating this damage, you should consider the character and situation of the entire tract and of the portion that will remain to the defendants, the condition in which the severance will leave the remaining land, whether or not the severance will leave the remainder more difficult of access, the uses for which the portion not taken is most valuable, and if you believe that that also contains waters not part of any stream, but which could be collected and carried below for use, and that the effect of putting the part sought to be taken to the proposed use, and the ownership and control thereof by the city would prevent, hinder or make impracticable the collection of such waters, or the carrying or conducting of such waters to other places where they might be used, then this tract is to be considered

with all the other circumstances in determining such damage to the part not taken.

32.

1027 From all these considerations, it is your duty to determine what is a reasonable, fair and just compensation to the defendants for their right, title, interest and estate in the property described in the complaint, and sought to be condemned in this action, and what, upon a reasonable, fair and just consideration of the evidence is the true amount of the damage that will be done to the remaining portion of the defendants' lands, embraced in the same parcel by the severance of it from the portion sought to be condemned, and to return the several amounts in your verdict.

33.

It is admitted by the plaintiff, and there being no evidence to the contrary, it must be concluded in any event, that no benefit will accrue to any property of the defendants by the construction of any improvement proposed to be made by the plaintiff, nor by any diversion, distribution or delivery by the plaintiff of any water included in the land sought to be condemned, and upon this point your verdict will be in accordance with such admission.

34.

You are the exclusive judges of the weight of the evidence and of the credibility of the witnesses. The court must allow any evidence to be introduced which tends in the slightest degree upon any reasonable theory, to establish any material fact in the case. It must be allowed by the court, even if its materiality depends upon the existence *upon* some other fact which *is* disputed, and which, if, non-existant would render the other evidence immaterial. The reason for this is, that the court cannot decide any question of fact, bearing upon the issues submitted to you. But your province is, to decide all question- of fact, and you are to determine for yourselves what weight you believe should be given to any and every part of the evidence.

1028 35.

Nine of your number may agree upon and return a verdict without the concurrence of the other three. And whenever you have agreed you will return your verdict into court.

To which said instructions the defendants then and there duly excepted, and upon the following grounds, stated and specified at the time:

Ex. 30. 3. We except to all that portion of the third instruction after the words "fee-simple" in the second line. That is, to that portion of the instruction in which the jury are instructed that the rights of defendants as riparian owners are subject to the rights of the city of Los Angeles in the waters of the Los Angeles river. And to every portion of said instruction which implies that the rights of the defendants as riparian proprietors are impaired or diminished

by any superior rights of the city, or in any manner affected by such superior rights, upon the ground that the city of Los Angeles has not any superior rights to the rights of these defendants as riparian owners.

Ex. 31. 4. We except to the fourth instruction and to every part of it, upon the ground that if the city of Los Angeles has any superior or paramount right as the successor of the pueblo of Los Angeles, that superior or paramount right is confined to the pueblo uses, and to the limits of the extent of the pueblo, and that the city, as against these defendants, has no paramount rights to the waters of the Los Angeles river to the extent that may be necessary to supply the uses of its inhabitants for municipal uses and purposes for which the city may require water, or any municipal uses and purposes beyond those uses and purposes to which it was applied or might have been applied by the pueblo; and within the limits of the pueblo, that the city has not any paramount right to the waters of the Los Angeles river for use on districts of land included
1029 within the city boundaries which were not within the pueblo limits; nor to supply artificial lakes in public parks, nor to maintain and flush an outfall sewer to the sea; that it has no paramount right to take the waters of the river to meet any needs which the growth of the city in the future may require; but, on the contrary, for all such extraordinary uses, and for use beyond the limits of the pueblo, the rights of the city in the waters of the Los Angeles river, are not superior to those of the defendants.

Ex. 32. 5. The defendants except to the fifth instruction, and to every part of it, wherein the jury are instructed that the defendants have no right to use or divert the waters of the river so as to diminish the same to such an extent that it will not furnish the amount needed for the supply of the city for the purposes which have been before stated, and that the fact that the defendants had no such right was to be taken into consideration in determining the value of the land taken. We except to that instruction upon the same ground as to the last one mentioned, that the city has no such superior right and no right of the city is impaired by the use of the waters by these defendants.

Ex. 33. 6. The defendants except to so much of the sixth instruction as implies that the defendants have not the right to use the waters of the river on their land for any and for every lawful purpose until after the wants of the city are supplied, as such wants had been before defined, upon the ground that said portion of the instruction is not law, and that the rights of these defendants are not subject to any paramount right of the city to use the water outside of the limits of the pueblo, or for such purposes as maintaining artificial lakes or sprinkling streets or maintaining or flushing outfall sewers to the sea.

Ex. 34. 8. The defendants except to the eight- instruction
1030 defining the rights of owners in lands and subterranean water-courses upon the ground that there is no evidence in this case proving or tending to prove that there is any such subter-

ranean water-course or stream in the lands of these defendants, and therefore no evidence to which said instruction is applicable.

Ex. 35. 9. The defendants except to that portion of the ninth instruction wherein the jury are instructed that the owners of lands through which the natural water-course or surface or subterranean stream flows, cannot, by digging in his own soil, collect and divert the percolating waters, because such percolating waters may find their way into such water-course, or whether the effect would be to cause any of the running waters of the stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn by such excavation, any more than if said excavation was made so as to tap said stream directly, because, first, said instruction is not law, as the owners of the lands through which waters are percolating has the right to collect the same and to make any beneficial use of them, without regard to its effect upon the stream or springs or wells in his neighbor's land; and, secondly, there is no evidence in this case to which it is applicable. There is no evidence in this case tending to show that the effect of taking the water in this land would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn, any more than if said excavation was made so as to tap said stream directly or that it would have that effect at all.

Ex. 36. 10. The defendants except to the tenth instruction, and to every part of it, because the same is erroneous in this: First, that the owner has the right to the percolating waters on his land, whether they eventually percolate into some spring or stream, or not; and more especially where they are lost before reaching the
1031 point where they would have gone into or made up a part of the surface, or subterranean stream, in this case, the Los Angeles river.

And, secondly, because the said instruction is contradictory in this: It assumes in one part that the water is lost before it gets into or makes up a part of the surface or subterranean stream of the Los Angeles river, and in another that it enters the same at some point above the city boundary of the pueblo lands of the city of Los Angeles.

And, upon the further ground, that the instruction is inapplicable, because there is no evidence that there are any pueblo lands of the city of Los Angeles at any point to be affected by such diversion, and no evidence that the percolating waters would be gathered into the Los Angeles river at any point.

Ex. 37. 11. The defendants except to that part of the eleventh instruction limiting the rights of these defendants, to the additional market value of the land accruing by reason of the rights and advantages there referred to, the limitation being that they are so entitled to such additional damage so far as they do not interfere with or impair the rights of the city aforesaid; because, first, the defendants are entitled to that additional value pertaining to the said lands by reason of the presence of the percolating waters; and

that the ownership thereof or the development and use of the same do not impair any right of the city.

And, secondly, the said instruction is uncertain, because it does not appear that the rights of the city would be impaired by reason of those rights and advantages referred to in said instruction.

Ex. 38. 14. The defendants except to the fourteenth instruction, wherein it is said that the Los Angeles river is composed of its main stream and any branches it may have, whether surface or
1032 subterranean. The part we except to is "or subterranean," because there is no evidence that there are subterranean streams at all.

Ex. 39. 15. We except to the fifteenth instruction, defining a water-course; to that part of it wherein it is said that such bed may consist of any material which keeps the waters from penetrating below a certain depth, on the ground that it is not an element of the definition of a water-course, the character of the material, nor the depth to which the waters are prevented from penetrating.

Ex. 40. 16. The defendants except to the sixteenth instruction and every part of it, first because it does not correctly define a water-course.

Secondly, that, in so far as it is declared that the water need not flow in a defined channel under ground as a solid body of moving water of any particular dimensions in order to constitute a water-course, it is erroneous.

And that part of the instruction where the jury are told if they find that there is a bed or river bottom filled to a considerable depth with sand, gravel or other porous material, meandering over which a stream runs on the surface, and through and in which the water moves under ground, enough of it rising to the surface to supply the surface stream, and the other portions of the underground water moving with a much less velocity than the surface stream, and through a wider or larger space, in and through the interstices of the porous material, but in the same general direction as the surface stream, and in connection with it, and in a course, and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy; then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface—that portion of the instruction is erro-
1033 neous, because from the conditions and facts stated in the said instruction, the conclusion that they are to be taken as a part of the waters of the water-course is neither a legal conclusion, nor does it follow as an inference of fact; but on the contrary, from the facts stated, the conclusion should be that the waters are percolating and are not a water-course.

And, furthermore, because the statement does not contain a statement of all the facts proven in this case upon which the conclusion as to whether the waters are percolating waters or a water-course, is to be reached.

And, furthermore, because it is a charge to the jury upon a matter of fact.

The latter part of the instruction, that if such water-course exists it is immaterial, so far as the water-course is concerned, from or through what lands the waters flow in reaching the channel, or whether they reach the same by percolation or by clearly defined stream, is erroneous, for the reason it cannot be determined what is meant by a water-course and what by percolating waters, or what by a clearly defined stream; and that, from the previous part of the instruction, the jury may infer that water moving in any way may be a water-course or a clearly defined stream or percolation.

Ex. 41. 17. The defendants except to the seventeenth instruction, for the reason that the same is a charge to the jury upon a matter of fact; that the instruction does not contain all the facts upon which the conclusion that the jury are directed to reach from the finding of those facts would depend; and, further, that the conclusion directed, namely, that they should find that the waters both above and below ground, flowing under the conditions there stated should be deemed a part of the same stream from its sources to its outlet, is not warranted by the facts stated; but, on the contrary, the facts state the waters are percolating waters and
1034 are not a water-course and do not belong to the Los Angeles river.

And, furthermore, the conditions assumed in the said seventeenth instruction, as to the waters flowing under ground, are not proven, nor was there any evidence tending to prove them, nor to prove the facts therein stated; and, among other things, there is no evidence that anything does occur to change the course of the underground channels or to combine or collect the water into one general body of water, or force the same to turn and move easterly in a similar channel through these lands and on down the general course of the Los Angeles river.

Ex. 42. 18. The defendants except to the eighteenth instruction for the reason that, under the facts therein stated, the waters therein referred to, except those which rise to the surface and now in the channel, are percolating waters, and the subterranean waters flowing under the conditions there mentioned are percolating waters, and belong to the owners of the soil, namely, these defendants; or, at least, that part of it which flows through their lands; and they are not a part of the waters of the Los Angeles river so as to be governed by the laws applicable to water-courses.

For the further reason that the said instruction is a charge to the jury upon matters of fact; and for the further reason that the said instruction does not contain a statement of all the facts upon which the conclusion the jury are directed to draw depends.

Ex. 43. 16, 17, 18. And the defendants further except to the sixteenth, seventeenth and eighteenth instructions upon the ground that they are inconsistent with each other; and, furthermore they except to each one of the said instructions upon the ground that each is inconsistent with the nineteenth and with the twentieth instruction.

Defendants further except to the sixteenth, seventeenth and
1035 eighteenth instructions, and each of them, because neither one of them, nor all of them combined, correctly define percolating waters or natural water-courses.

Ex. 44. 18. And, further excepting to the eighteenth instruction, and to that part of it wherein it is said that the said waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom enters within the limits of the city of Los Angeles, crossing its northern boundary—that the fact which it is there assumed that the jury may find is one in support of which there is no evidence.

Ex. 45. 20. The defendants except to that portion of the twentieth instruction wherein the court says, "but if such water does collect under ground and flow in certain courses or channels through coarse permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface, and although the space through which the channel extends may be largely filled with the material through which the water flows," on the ground there is no evidence to which the said portion of the instruction is applicable, and no evidence that such water does collect under ground and flow in certain courses or channels through any kind of material.

Ex. 46. 21. The defendants except to the twenty-first instruction, and to the whole of it, upon the following grounds: That there is no evidence that the Los Angeles river, from the time it first appears on the surface a few miles above the tract of land in controversy does, at any place for miles above the north boundary of the city, sink in porous material, or that it passes down along in the same channel underground, or rises again to the surface, or flows as a sur-
1036 face stream; and there is no evidence to justify that portion of the instruction that, under the facts there stated—that is, where it flows in a channel under ground and rises again—it is no less a stream and water-course at the point where it flows under the surface than at the place where it runs on the surface. The evidence in the case shows that, from the time the Los Angeles river first makes its appearance on the surface, it never does sink again until after it enters the city of Los Angeles.

The defendants except also to that part of the twenty-first instruction wherein it is declared, after the facts there stated, that if a part of the water remains moving under ground at the places where the surface stream flows, all of the water, both above and below the surface, constitutes the stream, upon the ground that it is inapplicable to the evidence in the case, or else is not correct as a matter of law. The evidence shows that the water moves through the entire San Fernando valley, for a width from—above the tract of land in controversy—varying from two miles to six or eight miles; that the water is flowing in every part of it; that the underground flow is not the waters flowing immediately beneath the bed of the surface flow of the river.

Further, there is no evidence to warrant the instruction that, if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material, forming the semblance of an underground lake or reservoir, with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel, and afterwards reappearing below, as a surface stream, then the water would be as much a part of the stream while it was contained in such underground lake or widened chan-
1037 nels while it was flowing on the surface, because there is no evidence to which that portion of the instruction is applicable.

Ex. 47. 23. The defendants except to the twenty-third instruction, because there is no evidence to which it is applicable; and all of the evidence upon the subject of the control of the underground flow is that the lands of these defendants hold the control of the situation; and is, besides, directing the jury that they may speculate upon the intentions and actions of others. That instruction is the one where the jury are directed that they may take into consideration the effect that the excavations of others, upon other lands not belonging to these defendants, might have upon the percolating waters in the lands of the defendants by diverting them away from those lands. There is no evidence in the case tending to show that any such effect would follow; and the jury are thereby permitted to speculate upon what some persons may do in the future as affecting the value of the lands sought to be taken now.

Ex. 48. 24. Defendants except to the twenty-fourth instruction, wherein the jury are directed that the rights of these defendants to the water power on their lands are subject to the paramount right of the city to use and control the whole of said waters so far as needed for the use of its inhabitants, for the reason that the city has no such paramount right; and, furthermore, there is no evidence that such use of the water for water power would or could in any manner affect the city, either in its paramount, equal or subordinate rights.

Ex. 49. 25. The defendants except to that portion of the twenty-fifth instruction wherein the jury are directed, from all the evidence, to determine the actual value of the land at the date of the issuance of the summons, for the reason that the said instruction is erroneous because the defendants are entitled to the actual value at that date.

1038 Ex. 50. 26. The defendants except to the twenty-sixth instruction first, because it is erroneous in making the market value of the land the test of the amount of compensation to which the defendants are entitled.

Second, because there is no evidence warranting an instruction that the jury were not to consider the value as the sum which the city might be compelled to give for it, by reason of the necessity it might be under to obtain it, because there is no evidence that there was any such necessity.

And for the reason that the instruction that the value which it would be to the city as a location for headworks, was not to be

taken by the jury, is erroneous, that its value for the location of headworks, whether by the city or any one else, by reason of its situation is an element of the value.

And that portion of the instruction where the jury were instructed that the market value is not the sum that could be derived from the land for any special purpose for which it may be suitable, is incorrect in law, and the instruction is erroneous in that it makes the market value instead of the actual value the test of the amount of compensation.

Ex. 51. 27. The defendants except to the 27th instruction, for the reasons last above stated; that the market value is not the measure of compensation to which the defendants are entitled.

And upon the further ground, that the existence of the waters percolating in this land—that the assumption that the jury might find that the existence of the waters percolating in this land was not known at the time of the issuance of the summons, is not supported by and evidence; nor is there any evidence to which any instruction that any value which it possessed was not then known or could not be considered, could apply, because there was no evidence that the land posseesed any element of value which was not then known.

1039 Ex. 52. 28. The defendants except to the twenty-eighth instruction for the same reason, namely, first, that the market value is taken as a measure of compensation instead of the actual value; and second, in assuming that there was any information acquired concerning the percolating waters since the date of the issuance of the summons. The evidence shows that the lands always bore unmistakable evidence of the existence of the waters, and the subsequent development and excavations and inv-stigations have only confirmed that knowledge.

Ex. 53. 29. The defendants except to the twenty-ninth instruction, so far as the market value is made the measure of compensation instead of the actual value.

And they except to that portion of the instruction where the jury are told that, if they believe that said waters did not give said land an additional market value at that day—that is, the date of the issuance of the summons—or that if an additional market value were given, but the same did not equal the real value of said waters, then they must place on said lands a valuation equal only to the market value which they then had, including such additional market value which said waters gave to said lands irrespective of the true value of said waters, for the reason above stated; and for the further reason that there is no evidence to which it is applicable, and is a direction to the jury to speculate upon matters which there is no evidence to justify.

And the defendants except to the remainder of the instruction for the same reason.

Ex. 54. The defendants also except to every instruction wherein it is assumed or stated that the market value is the test of compensation, or that the value at the date of the issuance of the summons is the measure of their right to recover.

1040 Ex. 55. 32. Defendants except to the thirty-second instruction wherein the jury are told that it is their duty to determine what is the reasonable, fair and just compensation to the defendants for their right, title, interest and estate in the property sought to be condemned, in so far as such instruction implies that the right title, interest and estate is anything less than the fee-simple.

In excepting to the instructions upon the ground that the date of the summons cannot be fixed as the measure of the compensation, our exception is based upon the reason that the statute which undertakes to fix the date of the issuance of the summons in any case as the measure of compensation for the lands sought to be taken, is in violation of the constitution, and especially in a case where, as in this case, the summons was not served for nearly a year after the action was commenced.

The said defendants asked the court to give to the jury the following instructions:

I.

It is your duty in this case to fix and that which you are called upon to determine is the amount to be paid to the defendants for taking the land here sought to be condemned, and for the purpose of assessing the compensation and damages the right is deemed to have accrued at the date of the summons, and the actual value at that date is the measure of compensation for all property actually taken.

Given (See No. 2.)

SHAW, *J.*

II.

This same date is also taken as the basis of damages to
1041 property not actually taken, but injuriously affected, in all cases where such damages are allowed.

Given in substance. (See No. 2.)

SHAW, *J.*

III.

Damages to property not actually taken are allowed in the following case: Where the property sought to be condemned constitutes only a part of a larger parcel, the damages which will accrue to the portion not sought to be condemned by reason of its severance from the portion sought to be condemned, and the construction of the improvement in the manner proposed by the plaintiff are allowed.

Given in substance. (See No. 2.)

SHAW, *J.*

V.

In determining the actual value of the land taken, you are to take into consideration all of those factors which enter into and make up its value—the altitude of the tract; the capability of taking the waters, which may be developed thereon, to the city of Los Angeles and to the country east and west of it by gravity; the amount which

can be developed; the fact that the land sought to be condemned is so situated as to constitute the best place along the Los Angeles river for obtaining a supply of water and conducting the same either to the city or other tracts east and west of it; the needs of water in different places within reach of the tract of land here sought to be condemned, and the water developed thereon—are all circumstances to be considered by you in determining its actual value.

Given in substance. (See No. 22.)

SHAW, *J.*

1042 VI.

In determining, too, what is the actual value at the date of the summons, you are not to take, as the measure of that value, what an owner could realize at a forced sale, but the price that he could obtain after reasonable and ample time, such as would ordinarily be taken by an owner to make sale of like property; and in making that estimate you should take into consideration the use for which the property is suitable, having regard to the existing business or wants of the community, or such as might have been reasonably expected in the immediate future.

Included in instruction 25 as given.

SHAW, *J.*

VII.

So, too, in estimating the damage to that portion of the tract, not taken, if you should find that it is part of the entire tract, you should be governed by the same considerations. You should consider what that portion of the land not taken is most valuable for, and if you should believe that that also contains percolating waters that could be developed and applied to the supply of the communities below, and that the effect of putting the part sought to be taken to the uses for which it is intended, would be to draw from the waters of the remaining portion of the tract, or that the ownership and control of the tract sought to be taken would wholly prevent or render impracticable the development and conducting of the waters of the remaining portion of the tract to other points at which they might be utilized, those facts are to be considered by you in determining the damage done to the part not taken.

Given in substance (see No. 31).

SHAW, *J.*

1043 VIII.

In estimating the value of the property sought to be taken, you will also consider its fitness for agriculture and its value for that purpose, and for fruit-raising or stock-raising, the timber growing upon it, as well as the waters which may be percolating in the soil, and from the consideration of all of the uses to which the property may be applied from which profits may be derived, you will determine the value.

Given in substance (see No. 25).

SHAW, *J.*

IX.

In dealing with the question of water rights, in this land, you are not concerned with the laws which apply to navigable streams. The Los Angeles river is an innavigable stream. Through the lands sought to be taken, the Los Angeles river flows in its natural course, and the defendants therefore are riparian owners.

Refused because unnecessary.

SHAW, *J.*

X.

As such riparian owners, the defendants are entitled to a reasonable use of the water of the Los Angeles river for all lawful purposes on said lands, and this right does not exist as a mere easement, or an appurtenance, but the right to have the water flow as it was accustomed to flow through the lands of the riparian owner and to make such reasonable use thereof, is a part and parcel of the land itself, and the condemnation of the tract in fee, carries with it to the city of Los Angeles, upon its making payment therefor, all of the rights which pertain to the land by virtue of the law of riparian proprietorship, as above explained to you.

1044 Given in substance (see No. 6).

SHAW, *J.*

XI.

This right of the owners to have the waters flow as they were accustomed to flow with all the benefits that accrue to them or to the land by such flow including in such benefits the rights to the use of the water for domestic purposes and for watering stock and also the power obtainable through the difference of elevation at the point at which the water enters the land, and that at which it leaves it, and the right of reasonable irrigation and all other lawful use, are all elements that are to be considered by you in determining the value of the property.

Given in substance (see No. 6).

SHAW, *J.*

XII.

The rights of the ancient pueblo of Los Angeles, whatever they may have been were not attempted to be granted by the legislature to the city of Los Angeles, except to the extent of four square miles, and could not under any circumstances have extended beyond four square leagues.

Refused,

SHAW, *J.*

XIII.

The uses to which the pueblo was authorized to apply the water, *was* such purposes as appertained to the Spanish pueblo, under the civilization of those times, and it did not extend to the cultivation and irrigation of parks, or the creation and maintenance of artificial lakes therein, or supplying waters for an outfall sewer.

Refused,

SHAW, *J.*

1045 XIV.

The said pueblo of Los Angeles had no paramount rights to the use of the waters for any purpose, as against those grantees of the Mexican government under whom the defendants here claim; but the raising of stock, and tilling the land, granted by the Mexican government to these grantees, were as much parts of the policy of the Spanish and Mexican government, as the founding of pueblos and promoting the progress of those towns. And rights to the use of water by the grantees of these ranchos for domestic uses, and stock and agricultural purposes, were protected by the laws and policies of those governments as well as the interests of inhabitants of towns.

Refused.

SHAW, *J.*

XV.

Water filtrating or percolating in the soil, belongs to the owner of the freehold, like the rocks and minerals found therein, and he may use them as he chooses, free from any usufructo-ry rights of others.

Given in substance,

SHAW, *J.*

XVI.

Percolating waters being part and parcel of the soil, the owner of the land may develop those waters upon his own land for a useful purpose, without any regard to the effect that such development or diversion may have upon the flow of surface streams or wells or springs in the lands of others, or claimed or owned by others.

Given in substance,

SHAW, *J.*

1046 XVII.

The same law governs the rights of parties to the waters of an underground water-course, that applies to water-courses on the surface.

Given in substance (see No. 8).

SHAW, *J.*

XVIII.

Therefore, it is necessary to determine whether or not the waters constituting the underflow in the lands here sought to be condemned, are percolating waters or whether they constitute underground water-courses, and if the latter, whether they flow in such course, as that the city of Los Angeles would have any rights in them.

Given in substance.

SHAW, *J.*

XIX.

But, as the law of underground water-courses is the same as those flowing upon the surface, so also an underground water-course means

exactly the same thing as a surface stream, and to constitute such water-course, whether above or below ground, the waters must be flowing in a definite channel.

Refused as misleading.

SHAW, *J.*

XX.

To constitute a water-course, a stream must have beds and defined banks, and must be flowing in its course in defined channels.

Refused except as given in inst. 16 and other instructions.

SHAW, *J.*

XXI.

The injury caused to a subterranean supply of waters by
1047 lawful acts of an owner of land, unless the stream be well defined and its existence known or easily discernible, or unless the injury be caused by negligence or malice, gives no right of action in favor of other adjacent land-owners, or other persons through whose lands this underground flow might have ultimately found its way, but for such interference. In the enjoyment of his lands the owner may cut drains or mine, or quarry, or develop waters for use, though in so doing he interferes with the flow of waters in hidden, unknown or underground streams.

Refused except as given in inst. 12 and others.

SHAW, *J.*

XXII.

Innumerable little streams, finding their way through the soil, or seeping or percolating through the material of which it is composed, do not become water-courses simply because the amount, when exposed, is visible. A water-course must consist of beds, banks, or sides, and water, and the water must be flowing in a channel between banks more or less defined. It is not necessary that the water should flow continually, but neither is a mere swale, in which extraordinary freshets flow, sufficient to answer the definition. To maintain the right to a water-course or brook, it must be made to appear that the water usually flows in a certain direction, and by a regular channel, with banks or sides. Waters, whether under or above ground having no certain course or definite limits, such as those merely percolating through the strata of the earth and those diffused over its surface, are not water-courses, and are not subject to the rules of law applicable to water-courses. To entitle an underground stream to the consideration of the law, it is necessary that it
1048 be a water-course in the proper sense of the term. Percolations which spread themselves in every direction through the earth do not constitute water-courses.

Given in modified form in inst. No. 19.

SHAW, *J.*

XXIII.

The burden of proving that waters moving in the ground are flowing in natural water-courses, or in a defined channel, is upon

the plaintiff in this action. The presumption is that they are percolating waters.

Given in substance. (See No. 20.)

SHAW, *J.*

XXIV.

The jury are instructed that the waters, moving underneath the soil of the lands sought to be condemned here, are percolating waters, and they are a part of the soil.

Refused,

SHAW, *J.*

XXV.

The waters flowing underneath this land being percolating waters, they belong to the owners of the soil, and you are to take into consideration the value of those waters in estimating the compensation to be paid for the taking.

Refused,

SHAW, *J.*

As an alternative to the XXV, if the court refuses to give that instruction, defendants ask the following instruction.

XXV.

If, from the evidence in this cause, you find that the waters, moving underneath the surface of the land sought to be
1049 condemned, are percolating waters, as above defined, then such percolating waters belong to the defendants as owners of the soil; and if you find that a part of such waters are percolating, though not the whole, then such part as constitutes percolating waters belong to the owner of the soil, and you should consider the value of such percolating waters as constituting in part the value of the land, and in estimatiug the compensation to be paid for the taking.

Given, in substance. (See No. 12.)

SHAW, *J.*

XXVI.

Neither the city of Los Angeles, nor the ancient pueblo was the owner of the waters percolating in the lands lying above the limits of the city and of the pueblo. The grantees of those lands included within the Ranchos Providencia, Cahuenga and San Rafael took the title to the percolating waters, and whatever interest remained in the Mexican government in said lands or waters, passed to the United States upon the acquisition of California by that government, and the patent of the United States to the patentees, under whom the defendants claim, acquired the title which the United States had thus acquired in said lands and waters, and no act of the legislature of the State of California, purporting to grant to the city of Los Angeles, the waters percolating in the said lands, or purporting to convey the right to the city of Los Angeles to develop such

waters, and no act of the legislature assuming to recognize the existence of any such rights in the city of Los Angeles, could have any effect upon the title of the United States Government existing prior to the patent, nor any effect upon the title acquired by the patentees and their grantees and successors, under the patents.

Refused as unnecessary.

SHAW, *J.*

1050 XXVII.

Persons owning the whole of the soil constituting the bed and banks of a stream, are entitled to the whole rights and profits of the waters opposite their land, whether the water is used as a power to operate mills and machinery, or any other lawful purpose, subject only to the implied condition that they shall so use their own right as not to injure concomitant rights of another riparian owner on the same stream.

Given in substance (see No. 6).

SHAW, *J.*

XXVIII.

One who owns the fee to lands, owns from the surface to the centre of the earth, and owns also the waters percolating in the soil from the surface to the centre; and a patent from the United States Government of lands included within a confirmed Mexican grant, and without reservations as to the estate conveyed, passes the title in fee to the land, and no act of the legislature of the State can impair the grant, nor grant to another any rights in the property, and any attempt on the part of the legislature to create rights therein in another person is in violation of the Constitution of the United States and is void.

Refused as unnecessary.

SHAW, *J.*

XXIX.

The bed of a water-course is that soil so usually covered by water, as to be distinguishable from the banks by the character of the soil or vegetation or both, produced by the common presence and action of flowing water.

Refused,

SHAW, *J.*

1051 XXX.

The bed of a water-course does not extend to the centre of the earth, and the owner of the land underneath the channel of the stream has the right to the waters percolating beneath the bed, and may lawfully divert and use them, if diverted at such depth below the surface, or by such means, as not to interfere with the surface flow of the stream.

Refused,

SHAW, *J.*

XXXI.

As to such underground water coming within this designation of percolating waters, the contiguous proprietors and owners have no correlative rights, but each has the absolute power of control within his own premises.

Refused because substantially given in other instructions given.

SHAW, *J.*

XXXII.

And this term "percolate" as used in cases relating to the rights of land-owners to use water on their premises, and as used in these instructions, designates any flowing of sub-surface water, other than that of a running stream, open, visible, clearly to be traced.

Refused.

SHAW, *J.*

XXXIII.

The fact that these percolating waters may ultimately find their way, in whole or in part, into the Los Angeles river, does not modify or qualify the right of the owner of the soil to use waters. The title of the defendants, in this action, proceeding, as it does, from divers grants of the Spanish and Mexican governments, con-
1052 firmed by the board of land commissioners, upon which confirmation patents have issued from the United States, is determined by the law- of those governments and the effect of the United States patent under those laws and no act of the legislature of the State of California can alter the rights which vested in these defendants under those patents; nor can the legislature of the State of California, by its acts create any rights in any person or corporation, municipal or otherwise, in the lands of these defendants, or impose any easements or servitudes thereupon; and in determining the value of this property, you are to make the estimate upon the theory that the defendants are the owners in fee-simple of the tract of land sought to be condemned, with all of the rights, both in the surface flow of the Los Angeles river and in the waters percolating in the soil, as hereinbefore explained to you, wholly unaffected by any act of the legislature attempting to create any rights to the contrary.

Refused except as contained in other instructions.

SHAW, *J.*

XXXIV.

The court instructs you, that waters moving by force of gravity towards the outlet of the basin of a valley about 24 miles long and 12 miles in width in the widest place; down or along through the natural voids or interstices of the earth, composed of an alluvial or other deposit, and lying throughout the entire basin, and made up of loam, sand, gravel, and boulders mixed together and interspersed with irregular and broken strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, do not constitute a subterranean stream or water-course,

but such waters are percolating waters, and they are part of
1053 the soil in which they are found, and the owner of such soil owns such percolating waters therein and may appropriate them to any beneficial use which he may see fit, free and clear of the claims of any adjoining or contiguous land-owner, through whose lands they might otherwise flow, or the claims of any owner of waters, of which they might otherwise become a part.

Given as modified in inst. No. 19 and others.

SHAW, *J.*

## XXXV.

If you find from the evidence that the lands sought to be condemned are situated at the lower portion of and form a part of the San Fernando basin or watershed, near or at its outlet, and that said basin is about 24 miles long and about 12 miles wide at the widest point, and that said outlet is from one and one-half to three miles wide, and bounded and defined on its southern side by the rock of the Cahuenga range, and on its northern side by similar rock of the Verdugo hills, and that the earth of which said basin generally is composed, including said outlet and the lands sought to be condemned, is an alluvial or other deposit, made up of loam, sand, gravel and boulders, mixed together and interspersed with broken or irregular strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, and that, as the same lies in place, the natural voids or interstices of such earth generally throughout said basin, including the defendants' lands and said outlet, are equal to from one-fifth to one-third of the bulk of the entire mass, and that such entire deposit lies upon such a grade or slope toward and through the outlet of such basin, and that all the water- falling in the watershed of said basin which are not lost in the storm run-off, *of* through evaporation or in sup-
1054 porting plant life, sinks into the earth, composing such basin and thence by force of gravity moves down through such voids or natural interstices of the earth throughout the greater portion of the entire mass, to the outlet of said basin, through which they pass—then under such a state of the case you are directed to conclude that such waters so moving through such outlet of said basin or through or in the defendants' said land in the natural voids or interstices of the earth do not constitute a subterranean flowing stream or water-course, having a defined channel or course, but the same are percolating waters and belong to the owners of the soil in which they may be found, and if you further find from the evidence that any portion of such water moves into or through the defendants' land sought to be condemned, then they are the property of the defendants.

Given as modified in inst. No. 20.

SHAW, *J.*

## XXXVI.

You are further instructed, that the fact that these waters moving in the earth, may have definite directions, does not affect the ques-

tion of whether they are or are not percolating. The distinction between underground water-courses and percolating waters being, that the former flow in a defined channel while the latter move through the ingredients of the soil, and though they may have the same general direction with the surface stream, they do not thereby cease to be percolating waters. The water which is held by the soil is a part of the soil itself, and this rule is not changed by the character of the material through which the water percolates—whether it be loose sand or gravel, or a more compact substance. So long as the water is in a condition of filtration or percolation, it is a
1055 part of the soil and subject to the sole dominion of the proprietor of the land in which it was found. Nor does it make any difference that, after moving in a certain direction for a time from natural causes existing beneath the surface of the earth, its direction is diverted or changed; this does not change its character from percolating water to a flowing stream. Neither does it make any difference that some part of the material or some strata found underneath the surface, are more highly charged with water than other parts. It is frequently the case that the course of percolating waters is in some definite direction, and generally the case that all parts of the material are not equally charged with water; but those facts do not deprive them of the character of percolating waters, nor deprive the owners of the land of the ownership of such water; but such owner of the land, in which such waters are found, has the exclusive dominion over them, and does not violate the rights of any other person by appropriating them to his own use, even though the effect be to divert their course from adjacent lands, or to destroy advantages therefrom previously enjoyed by the adjacent proprietor or other person. You are, therefore, in making up your verdict, to take into consideration the value of such waters as you may find to be percolating in the soil of the defendants' lands, and you are to give a verdict for such amount as, in your opinion, will compensate the defendants for the property taken.

Refused,

SHAW, *J.*

But the court refused to give the said instructions, and the defendants then and there duly excepted to the refusal of the court to give the said instructions, and to the ruling of the court, in refusing to give each of them.

The jury retired and returned a verdict finding the value
1056 of an estate in fee-simple in the lands, including all their elements of value, subject to the paramount right of the city of Los Angeles, etc., to be $23,000.00, and the damage to the part not taken, $2,000.00.

In due time the defendants filed and served their notice of intention to move for a new trial, upon the grounds of error of law, occurring at the trial, and excepted to by the defendants, and also upon the ground that the evidence was insufficient to justify the findings of the court or verdict of the jury, and that the decision was against law; and also stating, in their said notice of intention,

that the motion would be made upon a statement of the case, and which said notice of intention was, in all respects, in due form of law; and the defendants now specify the following particulars wherein the evidence is insufficient to justify the verdict.

I.

The evidence is insufficient to justify the finding of the jury, that the value of the estate in fee-simple in the lands of these defendants, including all their elements of value, was $23,000.00, because:

(*a.*) The grants by the Mexican government of the Ranchos Cahuenga, San Rafael and La Providencia, and the patents from the United States Government, conveyed to the grantees and patentees, the estate in fee-simple, without any limitations, conditions or qualifications, and under which said patents these defendants claim and own the land, by deeds of conveyance that contain no limitations, qualifications or conditions of their title whatever, and there was no evidence proving, or tending to prove, that these defendants did not own the fee-simple of the said lands.

(*b.*) There was no evidence proving, or tending to prove,
1057 that the defendants were not the owners of the waters percolating in the soil. There was no evidence proving, or tending to prove, that the quantity of water percolating in the soil was any less than two thousand inches, measured under a four-inch pressure, or that the value thereof was less than five hundred dollars per inch, developed; and there was no evidence proving, or tending to prove, that the cost of developing the same would be more than one hundred and twenty-five thousand dollars.

The great preponderence of the evidence was that the amount which could be developed at a cost of $125,000.00, was for three thousand inches, measured under a four-inch pressure, and of a value not less than $500.00 an inch.

(*c.*) There was no evidence proving, or tending to prove, that any less than two thousand inches, measured under a four-inch pressure, could be developed in the tract of land, sought to be condemned, without diminishing the surface flow of the Los Angeles river; and the preponderence of evidence was, that three thousand inches could be so developed, without affecting the surface flow.

(*d.*) There was no evidence proving, or tending to prove, that the subterranean waters in the said lands, which could be so developed, were other than percolating waters.

(*e.*) There was no evidence proving, or tending to prove, that the city of Los Angeles had any right, title or interest in the said percolating waters.

(*f.*) There was no evidence proving, or tending to prove that the defendants were not the owners absolutely of the said waters, percolating in the said tract of land, sought to be condemned.

(*g.*) There was no evidence to support the finding of the jury of the value of the land, as being only $23,000.00, except by estimating it for the purpose of agriculture alone, and exclusive of the waters that could be developed therein.

1058 And the verdict of the jury is manifestly based upon the valuation thus made, and either upon the theory that there were no percolating waters in the soil, or else, that if *they* were they were not owned by the defendants, and there was no evidence proving, or tending to prove, either of those propositions.

(*h.*) There was no evidence proving, or tending to prove, that the city of Los Angeles was a pueblo, when either of the said Mexican grants were made.

(*i.*) There was no evidence proving, or tending to prove, that the city of Los Angeles had any paramount rights to the waters of the Los Angeles river of any kind.

II.

The evidence was insufficient to justify the verdict of the jury, that the remainder of the Pomeroy and Hooker tract would be damaged only in the sum of two thousand dollars; and for the reasons and in the same particulars set forth in the last specifications; and further, in this, that it is evident that the jury did not consider the effect which the condemnation of this land and taking the same by the city would have in preventing the defendants from developing the waters in the remainder of the tract and conducting them away to any place of use; and there was no evidence proving, or tending to prove, that the subterranean flow in the remainder of the 1,400-acre tract was not percolating water, or did not belong to these defendants, or was not of great value, or that that value would not be destroyed by the condemnation of this particular tract.

III.

The evidence was insufficient to justify the decision by the jury that the subterranean waters in the said tract, sought to be condemned, were other than percolating waters; or a decision
1059 that the said waters did not belong to the defendants, or that the quantity which could be developed thereon of said percolating, subterranean waters, was less than two thousand inches, or of a less value than one million dollars, or that the cost of developing the same would be more than one hundred and twenty-five thousand dollars; and there was no evidence to justify the decision by the court that the value of the estate of the defendants in the said land was no more than $23,000.00, except upon the ground either that the said subterranean waters were not percolating, or that the said percolating waters did not belong to the defendants.

IV.

The evidence is insufficient to justify the findings of the court in the following particulars:

(*a.*) That the taking of the 314-acre tract was necessary for the purposes mentioned in the complaint.

(*b.*) That the plaintiff is the owner, in fee-simple, of the exclusive right to the waters of the said river for the purposes mentioned in

the third paragraph of the complaint, or to the extent mentioned in the findings;

(*c.*) That there ever was any plan or system for the construction of the said works made by the city prior to the commencement of this action;

(*d.*) That the ordinance passed on the 8th day of June, 1893, and mentioned in paragraph V of the complaint, was passed in pursuance, or for the purpose, of carrying out any plan or system that had been inaugurated by the plaintiff;

(*e.*) That any system or plan inaugurated by plaintiff, before the commencement of this action, or at all, the water of the river is to be diverted on the lands, by means of a submerged dam, or otherwise;

(*f.*) That the greater part of the water of the river, flowing on the surface below and to the east of said lands, come into
1060 the river beneath the surface, at points adjoining the northern line of said lands;

(*g.*) That the surface water of said river, at all, or any, points above or below the said lands, is polluted to an extent that renders it liable to injure the health of the inhabitants of the city, if used by them for domestic purposes;

(*h.*) That it is impossible to determine in advance of the construction of the same, the place where the tunnels, filtration galleries, settling reservoirs or basins, or collecting chambers, should be constructed, or that it might be, or ever would be necessary in the construction of said works, to use the whole of said lands;

(*i.*) That the Los Angeles river, from year to year, makes any material change in its course or bed, through the said lands, or that any tunnel or tunnels constructed in said land, at a particular point, could not always be relied on to intercept the subterranean waters, or that there would be any necessity for the extension of the tunnels, galleries or chambers which might be constructed on the land, or to construct new ones;

(*j.*) That it was necessary for the plaintiff to acquire the fee-simple to the whole of the said lands, for any of the purposes mentioned in the complaint.

The defendants now specify the following errors of law occurring at the trial, and excepted to at the time by the defendants:

I.

The court erred in refusing to give the instructions asked by the defendants, and in refusing to give each of them.

II.

The court erred in giving the instructions to the jury which
1061 were given by the court, and in giving each of them; and especially the court erred in giving those instructions herein specified, to wit:

(*a.*) The court erred in giving that portion of the third instruction after the words "fee-simple" in the second line, that is, to that por-

tion in which the jury were instructed that the rights of the defendants as riparian owners, are subject to the rights of the city of Los Angeles in the waters of the Los Angeles river; and in giving every portion of said instruction, which implied that the rights of the defendants, as riparian proprietors were impaired or diminished by any superior rights of the city, or in any manner affected by such superior rights, because the city of Los Angeles had not any superior rights to the rights of these defendants as riparian owners;

(*b.*) The court erred in giving the fourth instruction, and every part of it; because, if the city had any superior right, as successor of the pueblo of Los Angeles, it was confined to the pueblo uses, and to the limits of the pueblo; and the city, as against these defendants, had no paramount rights to the waters of the Los Angeles river, to any extent, for any uses or purposes beyond those to which it was applied, or might have been applied, by the pueblo and within the limits of the pueblo. That it has no paramount right to the use of the waters of the Los Angeles river on districts not included within the city boundaries, and which were not within the pueblo limits; nor to supply artificial lakes in public parks, nor maintain nor flush an outfall sewer to the sea; and no paramount right to take the waters of the river which the growth of the city, in the future, might require; but for all such uses the rights of the city are not superior to those of the defendants.

1062 (*c.*) The court erred in giving the fifth instruction to the jury; and for the reasons above specified.

(*d.*) The court erred in giving to the jury so much of the sixth instruction as implied that the defendants had not the right to use the water of the river on their land for any lawful purposes until after the wants of the city were supplied, as such wants had been by the court before defined, in this, that the said portion of the said instruction is not law, and the rights of the defendants were not subject to any paramount right of the city to use the waters outside of the limits of the pueblo, or for the purpose of maintaining lakes or sprinkling streets, or flushing outfall sewers.

(*e.*) The court erred in giving to the jury the eighth instruction, defining the rights of owners in lands and subterranean water-courses, because there was no evidence in the case to which it was applicable; there was no evidence proving, or tending to prove, any subterranean water-courses or streams in the lands of these defendants.

(*f.*) The court erred in giving to the jury that portion of the ninth instruction, where they were told that the owners of lands, through which a natural water-course, or surface or subterranean stream flows, could not, by digging in his own soil, collect and divert the percolating waters, because such percolating waters might find their way into the water-course or where the effect would be to cause any of the running waters of the stream to leave the same to fill up the voids; any more than if the said excavation was made, so as to tap said stream itself, because the instruction was not law. The owner of land has the right to intercept the percolating water in his own land, without regard to the effect upon the stream or

springs or wells in his neighbor's land, and there was no evidence in this case to which it was applicable; no evidence that the effect of taking the water in this land would be to cause any of the
1063 running waters of said stream to leave the same, nor to fill up the voids left in the banks or beds from which the said percolating waters were drawn.

(*g.*) The court erred in giving the tenth instruction to the jury, and every part of it, because the owner has the right to the waters percolating on his land, whether they eventually percolate into some stream or spring, or not. Said instruction is contradictory in this; it assumes in one part that the water is lost before it goes into or makes up a part of the surface or subterranean stream of the Los Angeles river, and in another that it enters the same at some point above the city boundary of the pueblo lands of the city of Los Angeles; and further, the said instruction is inapplicable because there is no evidence that there was any pueblo lands of the said city of Los Angeles at any point, to be affected by such diversion, and no evidence that the percolating waters would be gathered into the Los Angeles river at any point.

(*h.*) The court erred in giving to the jury that part of the eleventh instruction, which limited the right of these defendants to the additional market value of the land accruing by reason of the rights and advantages there referred to, because the defendants were entitled to the additional value pertaining to said lands by reason of the presence of the percolating waters, and that the ownership thereof, or development and use of the same, did not impair any right of the city; and said instruction is uncertain, because it does not appear that the rights of the city would be impaired by reason of those rights and advantages referred to in said instruction.

(*i.*) The court erred in giving the fourteenth instruction, wherein it was said that the Los Angeles river is composed of its main stream, and any branches it may have, whether surface or subterranean; the error being in including the "subterranean
1064 waters." Because, there was no evidence that there were any branches of the Los Angeles river, or any subterranean stream at all.

(*j.*) The court erred in giving the fifteenth instruction, defining a water-course; because neither the character of the material composing the bed, nor the depth to which the waters are prevented from penetrating, is any element in the definition of a water-course.

(*k.*) The court erred in giving to the jury the sixteenth instruction, and every part of it, in that it does not correctly define a water-course; and in so far as it declared that the water need not flow in a defined channel under ground, as a solid body of moving water, of any particular dimensions, in order to constitute a water-course, it is erroneous; and as to that part where the jury were told that if they found there was a bed or river bottom filled to a considerable depth with sand, gravel or porous material, meandering over which a stream runs on the surface, and through and in which the water moves under ground, enough of it rising to supply the surface

stream, and other portions moving with a less velocity under ground than the surface stream, through a wider or larger space, and through the interstices of the porous material, but in the same general direction as the surface stream, and in connection with it, and in a course and within a space reasonably well defined, together with the other conditions contained in said instruction, were erroneous, because the facts there stated, if found by the jury, showed that the water was percolating, and not a water-course. And the conclusion that they were to be taken as a part of the waters of the water-course, was neither a legal conclusion nor an inference of fact; furthermore, the facts set forth in the said instruction do not contain a statement of all the facts proven in this case, upon which the conclusion, as to whether the waters were percolating or were a water-course, was to be reached. It was erro-
1065 neous, too, in that it is a charge to the jury upon a matter of fact. It was erroneous as being uncertain; for it cannot be determined what is meant in the instruction by water-course, or what by percolating waters, or what by a clearly defined stream, and from the instruction the jury might infer that water moving in one way may be a water-course, or a clearly defined stream, or percolation.

(*l.*) The court erred in giving to the jury the seventeenth instruction, because it is a charge to the jury upon a matter of fact, and the instruction does not contain all the facts upon which the conclusion that the jury were directed to reach from the finding of those facts, would depend. Furthermore, the facts stated in the instruction, if found by the jury, would establish that the waters were percolating waters, and not a water-course, and did not belong to the Los Angeles river; and, further, the conditions assumed as to the water flowing under ground, were not proven, and there was no evidence tending to prove them, nor to prove the facts in the said seventeenth instruction stated. There is no evidence that anything does occur to change the course of the underground channels, or to combine or collect the water into one general body of water, or to force the same to turn or move easterly, in a similar channel, through these lands, or down the general course of the Los Angeles river.

(*m.*) The court erred in giving to the jury the eighteenth instruction, in this, that under the facts there stated, the waters referred to, except those which rise to the surface and flow in the channel, are percolating waters, and the subterranean waters flowing under the conditions therein mentioned are percolating and belong to these defendants, and they were not a part of the waters of the Los Angeles river, nor governed by the laws applicable to water-courses; and, further, the said instruction was a charge to the jury
1066 upon matters of fact, and did not contain a statement of the facts, upon which the conclusion of the jury were directed to draw, depended.

(*n.*) The court erred in giving the sixteenth, seventeenth and eighteenth instructions, because they were inconsistent with each other, and each and all of them were inconsistent with the nine-

teenth and twentieth instructions; furthermore, neither one of them does, nor does all of them, correctly define percolating waters or natural water-course; and the court erred in that part of the eighteenth instruction wherein it was said, that the waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom enters in the limits of the city of Los Angeles, crossing its northern boundary; because the fact which it was there assumed the jury might find, was one which there was no evidence to support.

(*o.*) The court erred in giving to the jury that part of the twentieth instruction, wherein they were instructed that if the waters collect under ground and flowed in certain courses or channels through coarse, permeable material therein, where the existence and general course of the flowing or moving body of the water could be easily determined, then the water so moving in such channels would constitute a water-course, though not visible on the surface, and though the space through which the channel extends may be largely filled with the material through which the water flows; because there was no evidence to which such an instruction was applicable, and no evidence that the water did collect under ground, or flow in certain courses or channels, through any kind of material.

(*p.*) The court erred in giving to the jury the twenty-first instruction, in this, that there is no evidence that the Los Angeles river, from the time it first appears on the surface a few miles above
1067 the tract of land in controversy, does at any place, for miles above the north boundary of the city, sink in porous material, or passes down along in the same channel under ground, or rises again to the surface, or flows on the surface; and there was no evidence to justify that portion of the instruction that under the facts there stated, that is, where it flows in the channel under ground and rises again, it was no less a stream and water-course at the point where it flows under the surface, than at the point where it runs on the surface because the uncontradicted evidence in the case shows that, from the time the Los Angeles river first makes its appearance on the surface, it never does sink again until after it enters the city of Los Angeles, and the said instruction was erroneous in all the particulars mentioned in the specification of the defendants' exception thereto.

(*q.*) The court erred in giving to the jury the twenty-third instruction, in this, that there was no evidence in the case to which it was applicable; and it instructed the jury that they might speculate upon the intentions and actions of other people.

(*r.*) The court erred in giving to the jury the twenty-fourth instruction, in this, that the city has not any such paramount right to the waters of the Los Angeles river as is there assumed.

(*s.*) That part of the twenty-fifth instruction that directs the jury to determine the actual market value of the land at the date of the issuance of the summons, is erroneous, in this, that the defendants are entitled to the actual value at that date.

(*t.*) The court erred in giving to the jury the twenty-sixth instruction, in this, that it makes the market value of the land the test of

the amount of compensation to be paid to the defendants, whereas the defendants were entitled to the actual value; and there
1068 was no evidence warranting the instruction to the jury, that they were not to consider the value as the amount which the city might be compelled to pay for it, for there was no evidence that the city was under any such necessity, and it was erroneous in instructing the jury that they were not to consider the value it would be to the city as a location for headworks, in this, that its value for that purpose is an element that should have been considered in determining the value; and the said instruction was erroneous in directing the jury that the market value was not the sum that could be derived from the land for any special purpose for which it might be suited, and erroneous in making the market value, instead of the actual value, the test of the amount of compensation.

(*u.*) The court erred in giving to the jury the twenty-seventh instruction, for the same reasons last above stated; and further, in assuming that the jury might find that the existence of the percolating waters in the land was not known at the time of the issuance of the summons, because there was no evidence in the case to which such an instruction was applicable, nor was there any evidence that any value which it possessed was not then known.

(*v.*) The court erred in giving to the jury the twenty-eighth instruction, in this, that it makes the market value instead of the actual value, the measure of compensation, and in assuming that there was any information acquired concerning the percolating waters since the date of the issuance of the summons.

(*w.*) The court erred in giving to the jury the twenty-ninth instruction, in so far as it makes the market value a measure of compensation, instead of the actual value. And in that it assumes that the jury may find that the percolating waters were not then
1069 known, or did not give an additional value to the land because there was no evidence to warrant such an instruction.

(*x.*) The court erred throughout the instructions in stating that the market value was the test of compensation, or that the market value at the date of the issuance of the summons was the measure of the defendants' right to recover.

(*y.*) The court erred in giving to the jury the thirty-second instruction, in this, that such instruction implied that the defendants' right, title and interest in said property might be less than the fee-simple, nor is there any evidence in the case to justify any such assumption, or to admit of any such a finding.

(*z.*) The court erred in giving each of the instructions given by the court, at the request of the plaintiff.

## III.

The court erred in admitting the statutes of 1850, 1852, 1854, 1874, 1875, 1877–'78, and 1889, in evidence in this cause, over the objections of the defendants.

IV.

The court erred in overruling the objection of the defendants to the question put to the witness Eaton, as to whether in his opinion the whole of the land would be necessary for that purpose.

V.

The court erred in sustaining the objection of the plaintiff to the question put to the witness Finckle, as to whether anybody who knew a water-course when they saw it on the surface, would know what the witness meant by a water-course when he saw it under ground.

VI.

1070 The court erred in sustaining the objection of the counsel for the plaintiff to the question put to the witness Finkle, as to whether he would call any stream a water-course, the waters of which move at the rate of 14 or 17 miles per annum.

VII.

The court erred in overruling the defendants' objections to the question put to the witness Friel, on cross-examination, as to whether, in his opinion, if there was no mountain shed to the basin, or simply the basin itself to furnish water supply, there would be any water supply there other than the supply necessary for its own uses; and in overruling the objection to the question put by the court to the same witness, in the same connection, as to whether there would be any stream of water issue from that basin, with the same amount of rainfall.

VIII.

The court erred in overruling the objection of the defendants to the question put to the witness Friel as to what eminent engineers, as a general thing estimated the velocity of the flow of underground waters in sand and gravel and boulders.

IX.

The court erred in overruling the defendants' objection to the question put to the witness Charles Foreman, as to whether he didn't hear about June, 1893, that Pomeroy and Hooker were trying to sell the land to the city at $30,000, and that the city refused to give it, and that nobody else did give it; because the said question was irrelevant, incompetent and immaterial.

X.

The court erred in overruling the objection of the defendants to the question put to the witness M. L. Wicks, as to whether he
1071 didn't hear, about June, 1893, that Pomeroy and Hooker gave an option to the city of Los Angeles for this same tract of land, with the addition of about a hundred acres more, for about $30,000, and that the city refused to take it, and in overruling the

objection to the question after the words, "the city refused to accept it," had been withdrawn from the question, in this, that the said question was irrelevant and immaterial, and it was incompetent.

XI.

The court erred in sustaining the objection to the question put to the witness Cullom, by the defendants, as to the value of the water upon the tract developed at five hundred to 3,000 inches of water, and in requiring the counsel to limit the question to the market value, in this, that the market value is not the rule made by the statute, but it is the actual value.

XII.

The court erred in sustaining the objection to the question put to the witness Purcell, after testifying that they had not measured the water above and below where the Crystal Springs pipes were taken out in the Los Angeles river, and saying that they could not have determined at once with absolute certainty, whether there was a greater or less quantity of water below where these pipes were, than above, without they had taken the trouble to measure it; that it might require a series of careful measurements, and the city does not always give us all the money we want, to make all the investigations; that they had made all the investigations that they had the time and means to make, whereupon the counsel for the defendants, while still cross-examining the witness, asked the
1072 following question: "That still don't answer my question. You could have determined it if you wanted to, couldn't you?"

Which question was objected to as incompetent, irrelevant and immaterial, and the court sustained the objection, and the defendants now specify the said ruling as error on the part of the court.

XIII.

The court erred in sustaining the objection of the plaintiff to the question put to the witness Purcell, concerning his report to the Sierra Water Company.

XIV.

The court erred in sustaining the objection of the plaintiff to the question put by the defendants to Mr. Lippincott, as to whether there was any other point at which observations had been made under the same conditions.

The foregoing, being the substance of all the evidence in the cause material to all the questions involved on motion for a new trial, and of the proceedings on the trial of the said cause, the defendants now ask that the proposed statement on motion for a new trial be certified, allowed and settled as correct.

The foregoing statement on motion for new trial, consisting of the matter therein contained, and of the matters in the foregoing bill

of exceptions, hereunto annexed, incorporated in said statement by the stipulation contained in said bill,—is hereby settled and allowed and certified to be correct.

Dated this March 25, 1897.

LUCIEN SHAW,
*Judge of the Superior Court.*

Endorsed: Filed Mar. 25, 1897. T. E. Newlin, clerk; by Sherman Smith, deputy clerk.

1073 (Title of Court and Cause.)

*Defendants' Fourth Bill of Exceptions.*

Be it remembered, that after the findings and decision had been made and filed in the above-entitled action, and the judgment thereon and upon the verdict had been entered and within the time prescribed by law thereafter, to wit, on the 6th day of April, 1896, the defendants filed in said action a memorandum of their costs and disbursements in said action, necessarily incurred by them and duly verified, of which memorandum of costs, with the indorsements thereon, the following is a copy, to wit:

(Title of Court and Cause.)

*Defendants' Memorandum of Costs and Disbursements.*

| | |
|---|---|
| Fees for serving subpœnas | $13.50 |
| Clerk's fees | 11.90 |
| Reporter's fees | 872.45 |
| Witness fees. | |
| G. O. Newman, 20 days' attendance | 40.00 |
| G. O. Newman, 30 miles traveled | 3.00 |
| L. Friel, 21 days' attendance | 42.00 |
| L. Friel, 1 mile traveled | .10 |
| James T. Taylor, 20 days' attendance | 40.00 |
| James T. Taylor, 1 mile traveled | .10 |
| F. C. Finkle, 19 days' attendance | 38.00 |
| F. C. Finkle, 30 miles traveled | 3.00 |
| A. K. Nudson, 8 days' attendance | 16.00 |
| A. K. Nudson, 8 miles traveled | .80 |
| C. W. Sanders, 18 days' attendance | 36.00 |
| C. W. Sanders, 1 mile traveled | .10 |
| Joseph Lippincott, 3 days' attendance | 6.00 |
| 1074 Joseph Lippincott, 1 mile traveled | .10 |
| John A. Pirtle, 1 day's attendance | 2.00 |
| John A. Pirtle 1 mile traveled | .10 |
| Amount forward to next page | $1,125.15 |

| | | |
|---|---|---|
| | Amount brought forward from page 1 | $1,125.15 |
| | Witness fees—Continued. | |
| | Charles M. Parker, 1 day in attendance | 2.00 |
| | Charles M. Parker, 8 miles traveled | .80 |
| | James Clark, 1 day in attendance | 2.00 |
| | James Clark, 8 miles traveled | .80 |
| | W. H. Andrews, 6 days in attendance | 12.00 |
| | W. H. Andrews, 12 miles traveled | 1.20 |
| | Charles Forman, 5 days in attendance | 10.00 |
| | Charles Forman, 1 mile traveled | .10 |
| | George E. Franklin, 2 days' attendance | 4.00 |
| | George E. Franklin, 1 mile traveled | .10 |
| | M. R. Lopez, 1 day in attendance | 2.00 |
| | Mr. R. Lopez, 20 miles traveled | 2.00 |
| | E. Bouton, 5 days' attendance | 10.00 |
| | E. Bouton, 1 mile traveled | .10 |
| | Henry Nicholas, 5 days' attendance | 10.00 |
| | Henry Nicholas, 12 miles traveled | 1.20 |
| | W. N. Monroe, 9 days' attendance | 18.00 |
| | W. N. Monroe, 19 miles traveled | 1.90 |
| | Charles C. Brown, 1 day in attendance | 2.00 |
| | Charles C. Brown, 8 miles traveled | .80 |
| | F. B. Yoakum, 4 days' attendance | 8.00 |
| | F. B. Yoakum, 1 mile traveled | .10 |
| | M. L. Wicks, 4 days' attendance | 8.00 |
| | M. L. Wicks, 1 mile traveled | .10 |
| | E. F. Billmeyer, 1 day's attendance | 2.00 |
| | E. F. Billmeyer, 1 mile traveled | .10 |
| | F. W. Wood, 1 day in attendance | 2.00 |
| | F. W. Wood, 1 mile traveled | .10 |
| | R. W. Martin, 1 day in attendance | 2.00 |
| | R. W. Martin, 1 mile traveled | .10 |
| 1075 | W. B. Cullen, 1 day in attendance | 2.00 |
| | W. B. Cullen, 1 mile traveled | .10 |
| | M. G. McKoon, 2 days' attendance | 4.00 |
| | M. G. McKoon, 1 mile traveled | .10 |
| | T. W. T. Richards, 1 day in attendance | 2.00 |
| | T. W. T. Richards, 1 mile traveled | .10 |
| | E. V. Baker, 1 day in attendance | 2.00 |
| | E. V. Baker, 1 mile traveled | .10 |
| | W. H. Goucher, 1 day in attendance | 2.00 |
| | W. H. Goucher, 1 mile traveled | .10 |
| | John H. Quintin, 1 day in attendance | 2.00 |
| | John H. Quintin, 1 mile traveled | .10 |
| | Albion C. Martin, 10 days' attendance | 20.00 |
| | F. C. O'Brien, 10 days' attendance | 20.00 |
| | H. T. Hazard, 1 day in attendance | 2.00 |
| | H. T. Hazard, 1 mile traveled | .10 |
| | Amount forwarded to page 3 | $1,285.35 |

| | |
|---|---|
| Amount brought forward from page 2 | $1,285.35 |

Witness fees—Continued.

| | |
|---|---|
| H. Hawgood, 1 day in attendance | 2.00 |
| H. Hawgood, 1 mile traveled | .10 |
| W. Mulholland, 2 days' attendance | 4.00 |
| W. Mulholland, 1 mile traveled | .10 |
| W. J. Ludlow, 4 days' attendance | 8.00 |
| W. J. Ludlow, 1 mile traveled | .10 |
| W. Putney, 4 days' attendance | 8.00 |
| W. Putney, 8 miles traveled | .80 |
| D. A. Beck, 2 days' attendance | 4.00 |
| D. A. Beck, 1 mile traveled | .10 |
| Samuel Gilmore, 4 days' attendance | 8.00 |
| Samuel Gilmore, 12 miles traveled | 1.20 |
| Walter G. Stevens, 1 day in attendance | 2.00 |
| Walter G. Stevens, 1 mile traveled | .10 |
| Total | $1,323.85 |

1076 STATE OF CALIFORNIA, *County of Los Angeles,* } ss:

R. H. F. Variel, being duly sworn, deposes and says: That he is one of the attorneys for the defendants above named, and as such is better informed as to the items charged in the foregoing memorandum than said defendants; that to the best of his knowledge and belief, the foregoing items of costs and disbursements in this action are correct, and that the said disbursements have been necessarily incurred in said action.

R. H. F. VARIEL.

Subscribed and sworn to before me this 6th day of April, 1896.

W. J. VARIEL,
*Notary Public in and for County of Los Angeles, State of California.*

[SEAL.]

Filed April 6th, 1896.

T. E. NEWLIN, *Clerk,*
By W. H. WHITTEMORE,
*Deputy Clerk.*

That thereupon and within five days thereafter the plaintiff filed and served a notice of motion to retax the said costs, based upon an affidavit, of which the following is a copy, to wit:

(Title of Court and Cause.)

"STATE OF CALIFORNIA, *County of Los Angeles,* } ss:

"W. E. Dunn, being duly sworn, deposes and says, that he is the attorney for above-named plaintiff, and that to the best of his knowl-

edge, information and belief the following-named witnesses actually attended upon the above-entitled court at the trial of said cause during the days set opposite their names:

"G. O. Newman, from March 4th to March 28th, inclusive
1077 "L. Friel, from March 5th to 28th, inclusive.
"James T. Taylor, from March 5th to 28th, inclusive;
"F. C. Finkle, from March 4th to 28th, inclusive;
"C. W. Sanders, for eight days only;
"E. Bouton, March 18th only;
"W. N. Monroe, for March 18th only;
"F. B. Yoakum, for March 18th only;
"F. C. O'Brien, did not appear at all;
"W. J. Ludlow, March 28th only;
"D. A. Beck, March 28th only;

"That the following-named witnesses were not legally required to attend as witnesses by the defendants: A. K. Nudson, Jos. Lippincott; John A. Pirtle; W. B. Cullen; M. G. McKoon; F. B. Yoakum; H. Hawgood and W. Mulholland.

"Affiant further says that no part of said sum stated in said memorandum of costs as reporter's fees was expended in reporter's fees in said case, except the sum of $105.00.

"W. E. DUNN."

"Subscribed and sworn to before me, this 15th day of April, 1896.

"[L. S.] FRANCIS J. THOMAS,
"*Notary Public, Los Angeles County, Cal.*"

That thereafter the said motion to retax said costs, came on to be heard in said court, before Hon. Lucien Shaw, superior judge who tried the said cause.

That it appeared from the records, papers and proceedings on file, and from the admissions and statements of the parties at the hearing of the said motion to retax, constituting the record upon which said motion was based, that at the beginning of the trial of said case and before any evidence was taken, it was stated by the counsel for
1078 the respective parties, each to the other, that each side would want a separate transcript of the reporter's notes of the testimony, written out by the reporter as rapidly as could be done by the latter, and furnished to them as the trial proceeded. That no agreement regarding the costs of the writing out of such transcript was made or entered into between the said several parties, unless as follows: Each party was informed by the reporter that his charges would be twenty cents a folio for the first copy and ten cents a folio for the second copy, and that if each would order a copy, that each would be expected to pay to the reporter therefor fifteen cents a folio for the writing out of said copy. Thereupon each party ordered a copy as aforesaid. All this was said during the noon recess of court and in the presence of the reporter and said attorneys respectively and the copies were furnished as ordered by the said parties respectively.

That no order was made by the court directing the writing out of such testimony by the reporter, nor was the court asked to make such order, nor was any agreement made in court in regard thereto.

That it was also understood that as the trial proceeded, each party was expected to, and did as required by a rule of court, pay one-half of the *per diem* of the reporter for reporting said case.

That the aggregate amount of the *per diem* for taking said testimony by said reporter, was $210.00, of which amount each party paid the one-half, to wit—$105.00 each.

That the aggregate amount of the costs of writing out the two transcripts of the testimony was the sum of $1,534.90, of which amount a bill — rendered to each party, plaintiff and defendant, by the said reporter for the sum of $767.45 and such amount was paid by each party to the said reporter.

1079 That upon the hearing to retax said costs, the court made and entered an order reducing and retaxing the defendants' cost bill, by striking therefrom the sum of $767.45, being the item of costs paid by the said defendants to the said reporter for transcribing the defendants' copy of the said testimony.

That it appeared at said hearing, and it was conceded and admitted before the court, that the writing out of said testimony for each side, plaintiff and defendant, was done in the course of the trial, to enable the attorneys for the respective parties to more fully prepare their several cases in the presentation of the same before the court, and was used by each for that purpose.

To which order of the court striking out said item of $767.45 from their said cost bill in the retaxing thereof, the defendants excepted, and they herewith present this bill of exceptions in support of said exception, and ask that the same be settled and allowed, and that thereafter the same be filed as a part of the record in said cause.

The foregoing bill of exceptions is hereby settled and allowed this 3rd day of March, 1897.

LUCIEN SHAW,
*Judge of the Superior Court.*

(Title of Court and Cause.)

Service of the within proposed bill of exceptions is hereby admitted this 2nd day of May, 1896. W. E. Dunn and Lee & Scott, attorneys for plaintiff.

Filed March 3, 1897. T. E. Newlin, clerk; by Sherman Smith, deputy.

John S. Chapman and R. H. F. Variel and John G. North, attorneys for defendants.

1080 (Title of Court and Cause.)

Bill of exceptions and defendants' statement on motion for new trial, settled, allowed and filed. All parties present in court.

Defendants move the court for a new trial herein on the grounds

stated in their notice of intention as specified in the statement of the case and bill of exceptions aforesaid. Said motion is submitted and thereupon it is ordered by the court that said motion be denied, to which ruling defendants except.

I hereby certify the foregoing to be a full, true and correct copy of an order entered on the minutes of said superior court, department No. 5, in the above-entitled cause.

Attest my hand, and the seal of the superior court, this 25th day of March, 1897.

T. E. NEWLIN, *Clerk*,
By SHERMAN SMITH,
*Deputy Clerk.*

(Title of Court and Cause.)

To the plaintiff in the above-entitled action and W. E. Dunn and Lee & Scott, attorneys for the plaintiff:

Notice is hereby given that the defendants in the above-entitled action appeal to the supreme court of the State of California from the order made and entered in the superior court of the county of Los Angeles, State of California, on the 25th day of March, 1897, in this cause, denying the defendants' motion for a new trial, and from the whole of the said order.

JOHN G. NORTH,
R. H. F. VARIEL, AND
J. S. CHAPMAN,
*Attorneys for Defendants.*

Endorsements: Filed March 27, 1897. T. E. Newlin, clerk; by George Varcoe, deputy. Received copy of the within notice this 26th day of March, 1897. W. E. Dunn and Lee & Scott, attorneys for plaintiff. John G. North, R. H. F. Variel and J. S. Chapman, attorneys for defendants.

1081

It is hereby stipulated and agreed, that the foregoing, including the maps and profiles accompanying the same, in one volume, constitutes a full, true and correct transcript of the record on appeal in this cause, consisting of the judgment-roll, including the bills of exceptions, the notice of appeal from the judgment and the proof of service thereof, the statement on a motion for a new trial, the order denying the new trial, the notice of appeal from the said order denying the new trial, and the proof of service; and it is further stipulated that an undertaking on appeal from the judgment and also an undertaking on appeal from the order denying the new trial, in due form, have been properly filed, and that each was filed within the time prescribed by law.

It is further stipulated, that, with the exception of the original transcript, the maps and profiles constituting exhibits in the case, have been by agreement of the parties put up in folios, and it is stipulated that they may be used in like manner as if bound in the transcript at the places in the bill of exceptions and statement

where reference is made to them. The maps and profiles to the original transcript are annexed.

W. E. DUNN,
LEE & SCOTT,
*Attorneys for Plaintiff.*
R. H. F. VARIEL,
JOHN G. NORTH,
J. S. CHAPMAN,
*Attorneys for Defendants.*

1082 Received copy of the within for the judge who tried the case this 26th day of June, 1897.

T. E. NEWLIN, *Clerk*,
By SHERMAN SMITH, *Deputy*.

Service of within accepted by copy this 28th day of June, 1897.

W. E. DUNN.
LEE & SCOTT,
*Attorneys for Respondent.*

(Here follow photographs marked pp. 1083 to 1111, incl.)

1112 Filed June 3, 1899.

In Bank.

THE CITY OF LOS ANGELES, Respondent,
*vs.*
A. E. POMEROY and J. D. HOOKER, Appellants. } L. A., No. 419.

This is a proceeding to condemn "all the estate, right, title and interest" of the defendants in and to a tract of land embracing about three hundred and fifteen acres, for the purpose of enabling the plaintiff—a municipal corporation—to construct and maintain thereon the "headworks" of its projected system for supplying water to its inhabitants for private and municipal purposes. The defendants, appealing from a decree of condemnation and from an order overruling their motion for a new trial, not only allege numerous errors in the rulings of the superior court, but challenge the correctness of its findings of fact in many important particulars. With respect to these disputed facts it will be necessary to state the various contentions of the parties in discussing the particular legal questions to which they give rise, and, passing them over for the present, we will, in this connection, only attempt to set forth the more general aspect of the case, as to which there is no substantial disagreement.

The city of Los Angeles, at the date of the commencement of this action, June 8, 1893, contained a population of about seventy thousand souls and covered an area of about twenty thousand acres. At the date of the trial, in March, 1896, the population was upwards of seventy-five thousand, having increased to that number from less than twelve thousand in 1880. This rapid growth of the city promises to continue, and the only source of water supply for its inhabitants and for municipal purposes is the Los Angeles river, which flows through the city from north to south. The principal source of the river above the city is the San Fernando valley. This valley, embracing a watershed of from four hundred and fifty to four hundred and ninety square miles, is almost completely enclosed by considerable ranges of mountains, rising in places to an elevation of over six thousand feet. The most important of these ranges is the San Fernando, which bounds the interior valley on the north. On the south and west it is bounded by the Cahuenga range, which at its northwestern extremity unites with the San Fernando. On the east the Verdugo hills are connected with the San Fernando range on the north, and, extending towards the south, leave a comparatively narrow outlet to the valley between their southern extremity and the eastern prolongation of the Cahuenga range. Through this outlet at the southeastern corner of the interior basin the Los Angeles river issues, flowing in an eastern direction parallel and close to the northern base of the Cahuenga range, until, having passed that obstruction, it turns to the south and flows through the city to the Pacific ocean. The interior of the San Fernando valley is a plain composed of detritus washed from the mountain sides, and having a moderate slope from the San Fernando range on the north

towards the Cahuenga range on the south, and from the west towards the east. This portion of the valley—that is to say, the portion composed of material not in place, detritus washed from the mountain sides—which, for convenience, may be called the valley proper, extends about twenty-four miles from east to west, and is about twelve miles wide at its widest part, embracing an area of about one hundred and eighty square miles. Its material is composed of boulders, gravel, sand and occasional masses of clay. The rainfall within the watershed of the valley is variable. When it is abundant, and the loose porous material composing the valley proper is thoroughly saturated, the streams issuing from the rocky cañons of the mountains flow over the surface to the outlet of the valley and pass off as flood waters down the channel of the Los Angeles river. But this surface flow does not continue for any great length of time, and under ordinary conditions the mountain streams sink in the sand within a short distance of the mouths of the cañons, and no water appears upon the surface until it shows itself again in the Los Angeles river, where it takes its rise a short distance north of the Cahuenga range on the southern side of the valley proper.

The land which the city seeks to condemn lies at the base of the Cahuenga range, in the narrow outlet of the valley. It is almost two miles in length from east to west and averages a quarter of a mile in width. At its eastern end it is about a mile west of the point where the Verdugo hills make their closest approach to the Cahuenga range—the width of the valley proper at this point being about two miles. Where the land lies the width is from two and a half to three miles. The surface of the river where it flows out of the land in question at its eastern end has an elevation above the sea level of about four hundred and sixty feet, and is two hundred feet higher than the main portion of the city of Los Angeles. In ordinary seasons, after the flood waters have run off and the river has assumed its normal condition, the water rises to the surface at some distance west of the land sought to be condemned, and increases rapidly in volume as it flows towards the east. There is considerable difference between the estimates of different witnesses, but it may be said in general terms in this connection, where strict accuracy is not important, that the surface flow of the river, where it enters the tract in ques-
1113 tion, is about twelve hundred inches, miners' measure, and that its volume is about doubled by the accessions it receives in passing through the tract. These accessions are of the character that would naturally be expected from the topography of the valley and the nature of the soil under and adjacent to the surface stream. The whole country on either side of the stream is found to be completely saturated with water—the plane of saturation near the open channel being slightly higher than the surface of the river, and gradually rising in proportion to the distance from the stream. From the sides and bottom of the visible stream the water percolates or trickles, or gushes, according to the nature of the soil, whether fine and comparatively compact, or coarse and gravelly and more loose and porous.

The plan of the city for utilizing the land which it seeks to condemn is to drive a tunnel through it from east to west, a few feet below the bed of the river, and to extend filtration galleries north and south from the tunnel in such number and at such places as may be found best adapted to securing an ample supply of water. The plan also embraces a submerged dam and collecting chambers or reservoirs, but the main feature is the tunnel with its lateral galleries, from which the water, draining and filtering out of the saturated soil, is to be delivered to the main supply pipe of the city, and thence to its distributing system.

The principal points of controversy between the parties are: First, as to the existence of a well-defined subterranean stream by which the waters, or a large portion of the waters, resulting from the rainfall within the watershed of the San Fernando valley, are carried off through the pass between the Cahuenga range and the Verdugo hills; and, second, as to the rights of the city of Los Angeles, as successor to the Mexican pueblo, in the waters of the Los Angeles river.

The claim of the plaintiff is that the city has certain extensive rights in the stream over and above those of ordinary riparian owners, and that the stream itself consists not only of the visible surface flow of the river, but of the large subterranean flow slowly passing through the boulders, gravel, and sand under and adjacent to the river.

Both of these claims are disputed by the defendants, and out of this controversy arise most of the points to be considered in disposing of the appeal. As to the rights of the city as successor to the pueblo, the allegation of the amended complaint is that ever since its organization the city has been the owner in fee-simple of the exclusive right to the use of all the waters of said river, from its source to the southern boundary of the city, in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, and of supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo, and for other municipal uses. And it is alleged that the defendants own the land sought to be condemned, subject to this right of the city to the waters of the stream. These allegations are denied by the defendants, and in view of the issue thus made the defendants before the commencement of the trial moved the court to stay the proceedings in the action until the determination of certain other suits then pending between the city and the defendants, in which the question as to their respective rights in the waters of the river was involved. The defendants also moved to strike out the allegations of the complaint setting up the claim of the city to the waters of the stream, contending that the city could not maintain a proceeding to condemn lands while asserting title in itself to that which constituted their chief value. These motions were denied by the superior court, and the exceptions to the rulings thereon give rise to the first point discussed in the briefs. Before taking up this point, however, it may be well to state the manner in which, by consent of the parties, the case was tried. It was stipulated that the court, sitting without a jury, should hear the evidence of the parties for the purpose of determining, first, whether

the use to which the property was to be applied was one authorized by law and the taking necessary. Second, whether the proposed plan was compatible with the greatest public good and least private injury; and, third, what was the nature and extent of the plaintiff's interest in the waters of the river. And these things being determined, that a jury should be impaneled to assess the amount of compensation to be awarded to the defendants for the interest condemned. In accordance with this stipulation the court heard evidence bearing upon the three points mentioned, and at its close called a jury before whom the trial proceeded upon the question of damages. During the progress of the jury trial the court made an oral announcement of its conclusions upon the issues submitted to its decision, but no formal findings were filed until after the jury rendered their verdict. The court, however, in charging the jury instructed them as to those matters so far as it deemed such instructions necessary.

The consent of defendants to this mode of trying the various issues in the case was, however, given with an express reservation of their objection that the court had no jurisdiction in this proceeding to try any question of title in the plaintiff to the waters of the river, and they now contend that the superior court erred in refusing to stay the trial of the cause until the respective rights of the parties had been determined in other pending suits; and this upon the ground that a proceeding for condemnation is not one in which adverse claims of title can be adjudicated.

This contention is rested upon the proposition that the proceeding being statutory and special must be strictly pursued, and, since the statute makes no express provision for litigating a claim by the plaintiff to an interest in the property sought to be condemned, the court has no power to determine such claim, at least when contested by the defendant. But we think the statute does not require so strict a construction. The superior court is invested with a general jurisdiction of all special proceedings not otherwise provided for; and in conducting such special proceedings exercises its usual and ordinary powers in disposing of the issues which are necessarily involved. Among the matters which may be involved in any proceeding to condemn private property for a public use are adverse claims to the compensation to be awarded. In such proceedings the complaint must contain the names of all owners and claimants of the property, if known (C. C. P. § 1244), and all persons claiming any interest in the property, or damages, though not named, may appear and defend. *Id.*, § 1246. And the court has power "to hear and determine all adverse and conflicting claims to the property sought to be condemned, and to the damages therefor." *Id.*, § 1247.

These propositions are, of course, conceded by the appellants, but they contend that the right to set up and litigate adverse claims is confined by the very words of the statute to those who are defendants. It is true the express provision above quoted from (section 247) applies only to the conflicting claims of those who are made,

or who make themselves, defendants in the proceeding, but
1114 this is only because the interests of the defendants alone are to be condemned. The statute does not contemplate the condemnation of an interest which the plaintiff already has, or the payment of any damages except to compensate those whose property is to be taken away; and, therefore, the plaintiff can have no concern in the determination of "adverse or conflicting claims to the property sought to be condemned and the damages therefor." But, although this provision of the statute has no direct bearing on the question here presented, it contains an express legislative recognition of the entire competency of the court to try and determine adverse claims to the property in a proceeding to condemn.

The question, however, which we have to decide is this: Can a plaintiff who is already the owner of an interest in land secure the condemnation of outstanding interests in a case which in other respects is a proper one for condemnation?

This is an important question, for it is apparent that such cases may frequently arise. Private property suitable and necessary for some lawful public use is often owned in shares by different persons, or subject to liens or servitudes, and the owner of a share, or an easement, or holder of a lien, may be the proper agent of the State for the exercise of its power of eminent domain. In such case it is certainly desirable that the law should supply a convenient procedure by which he could secure exclusive control and ownership of the property upon payment of the value of the outstanding shares, or of the whole, less the amount secured by lien, or as diminished by the existing servitudes. The defendants do not seem to contest the proposition that our statute is adequate to the exigencies of such a case, but they contend that, when the interest asserted by the plaintiff is disputed, the proceeding to condemn must be held in suspense until, in a separate action, the respective interests of the parties are judicially determined. But why the necessity of such circuity of action? Both branches of the controversy would in any event be tried and determined in the same forum, and there seems to be no good reason why they may not be litigated in one action. Even if the adverse claim of the plaintiff were first determined in an action to quiet title, its subsequent assertion in a proceeding to condemn—whether admitted or contested—would be just as foreign to any express provision of the statute as if his right had never been determined. It follows, therefore, that the argument that the court can do nothing in these proceedings, except that which is in terms authorized by the statute, proves too much. It would not only debar the plaintiff from proceeding before his title had been adjudicated, but would debar him always.

We see no reason for holding that a plaintiff is debarred from proceeding in such a case, nor can we see that the trial of all the issues in one action is attended with any special inconvenience. In whatever mode the plaintiff's interest in the property might be determined—whether in a separate action, or preliminarily in the proceeding to condemn, as was done in this case—the same consequences would follow, that is to say, the jury called to try the question of

damages would require instructions as to the nature and quantity of outstanding interest remaining in the defendants, upon which to base an estimate of the damages, and the defendant would have the same remedy in case of erroneous instructions in either case. Considerations of convenience, therefore, do not seem to sustain the contention of appellant on this point. On the contrary, it would seem that very great public inconvenience might ensue if a plaintiff, asserting an interest in property which he seeks to subject to a public use, were obliged in every instance to prosecute to final judgment an action to quiet his title before he could proceed to condemn. And if he can commence the proceeding to condemn before his interest has been adjudicated, it does not seem that a denial of his interest should stop the proceeding, for it is in the same court in which that issue must be tried in any event, and to try it when it is first made is only to do that which is necessarily incident to a proceeding clearly authorized, and express authority to do anything always implies the power to do that which is necessarily incidental.

If the views above expressed are in themselves reasonable, and if they embody a proper construction of the statute, they ought to prevail, even if opposed to previous decisions of this court; for no vested right can be violated or impaired by freeing a statutory remedy from inconvenient and burdensome restrictions imposed by a mistaken construction of the law. We are satisfied, however, that there is nothing decided in any of the cases referred to by counsel for appellants which is at all inconsistent with our conclusions. In Sacramento Valley R. R. Co. *vs.* Moffatt, 7 Cal., 577, it was held, construing an act of 1853, that the commissioners appointed to assess the value of the property had nothing to do with the settlement of adverse claims, and that the persons in possession of the land condemned for a railroad were entitled to the whole assessed value of the land, as against third parties out of possession but claiming a superior title. This may have been a correct construction of the act of 1853, but the question here is different, and the law is materially different. In Spring Valley W. W. *vs.* San Francisco, 22 Cal., 434, the act of 1853 was again construed, and it was again held that the commissioners appointed under that act to assess the value of the property condemned had nothing to do with adverse claims of ownership. That is a matter, it was said, to be determined by the court or judge before whom the proceeding was conducted, thus implying at least that the court could do what in the former case it was held it could not do. Wilcox *vs.* City of Oakland, 49 Cal., 29, contains a dictum in line with the decisions in the two cases last cited to the effect that the commissioners appointed to assess damages have no authority to try questions of title as between adverse claimants—a proposition having no relation to the point in dispute here. In San Jose *vs.* Freyschlag, 56 Cal., 8, which was a proceeding to condemn land for a street, the complaint alleged that the defendants were in possession and were the only owners and claimants of the land, and the answer set up the same fact. The jury, however, while assessing the damages at three hundred dollars, added a finding that defendants had dedicated the land for a street, and the court, adopting this finding,

condemned the land, and awarded the defendants one dime by way of compensation. This judgment was reversed upon the sole and obvious ground that it was in conflict with the pleadings and based upon a finding without the issues, the court remarking *obiter* that if the plaintiff had alleged the fact of dedication it would have alleged itself out of court, because it would thus have shown the existence, by virtue of the dedication, of the only right it could have acquired by the proceeding to condemn.

San Jose *vs.* Reed, 65 Cal., 242, was in all material respects the same as San Jose *vs.* Freyschlag, and was decided the same way. The correctness of these decisions, and of the dictum, added to the first must be conceded, but they are not in point. The pleadings in this case distinctly allege that the defendants have a certain interest in the lands to be condemned, but not the whole interest; they show, in other words, that there is something to be condemned, and what that something is, and clearly make the issue which the court is to try. S. F. and A. Water Co. *vs.* Water Co., 36 Cal., 639, was a suit by one water company to enjoin a rival corporation from carrying on a proceeding to condemn water rights as to which the plaintiff asserted a preferential right of condemnation. It was held that the action was well brought in the district court, because the ex-
1115 isting statute had not empowered the county court to try the question of preferential right between two corporations seeking to condemn the same property. This was no doubt a correct construction of the act of 1858, but our present statute is different (C. C. P., § 1247), and if the question were the same it would require to be differently decided, but it is in fact a very different question. In Aliso Water Co. *vs.* Baker, 95 Cal., 269, it was held upon special demurrer that the complaint was bad for uncertainty in the description of the interest sought to be condemned. The plaintiffs, in that case, endeavored to excuse the admitted uncertainty in the description of the water rights which they sought to condemn, upon the ground that they could not know the extent of such rights, and that it was, therefore, the duty of defendants to set out a certain description of what they claimed. Replying to this contention the writer of the opinion said that it necessarily implied the further contention that the defendants would be subsequently estopped from asserting any rights which they neglected to set out—a contention which he held could not be allowed, because this proceeding (to condemn) cannot thus be converted into an action to quiet title. This single expression in the opinion is all that appears to have any bearing upon the question here, and its bearing is only apparent, for, considered with reference to the point to be decided and in connection with what precedes and follows, it evidently means nothing more than this: that the plaintiff cannot in the proceeding to condemn, as he can in an action to quiet title, throw upon the defendant the burden of pleading the particular rights to be litigated, under penalty of forfeiting all that he does not expressly claim; or, in other words, that the rule of pleading in these cases requires the plaintiff to set out an accurate and intelligible description of the property, or the particular interest in the property, which, even in

case of default, must be valued before it is condemned. We are in entire accord with this doctrine, and we think the plaintiff here has fully satisfied its demands. It has given an accurate description of what it seeks to condemn, and ought to pay for, before it takes possession. It claims an interest in the property, or an easement which it says diminishes the estate and interest of defendants, and all this is set out in order that the court and jury may know precisely what is to be considered in estimating the damages. We cannot, in the time at our disposal, undertake to review the numerous citations from the text writers and the decisions of other courts to which we have been referred by counsel. They undoubtedly contain expressions which in some instances are in conflict with the views above expressed, but we find nothing fairly and fully decided which cannot be reconciled with the conclusion we have reached, that the superior court did not err in overruling the motions to stay the proceedings and strike out.

Second.

The appellants contend, in the next place, that the superior court erred in overruling their several demurrers to the complaint as amended. The ground of the demurrers upon which they insist in their argument here is that the last amended complaint contains no certain description of the property which the plaintiff seeks to condemn, and they cite the case of Aliso Water Co. *vs.* Baker, *supra*, in support of this contention. We do not think the cases are at all parallel. In the Aliso case the description was in the last degree vague and uncertain, but here the complaint shows that the object of the proceeding is to condemn all the estate and interest of the defendants in three hundred and fifteen acres of land, which interest is alleged to be a fee-simple estate, subject only to the asserted ownership by the city of the exclusive right to the use of the waters of the river from its source to the southern boundary of the city in trust, etc. If the interest claimed by the city is set forth with reasonable certainty it necessarily follows that the interest to be condemned is equally certain, and we see no difficulty in determining from the complaint what the city claims. It asserts a right to the use of all the waters of the Los Angeles river flowing through these lands paramount to and exclusive of any and all riparian rights in the owners of the lands. A great part of the argument of counsel for appellants is devoted to the question whether in fact and in law the city has any such right as she asserts, but this part of the argument seems to be out of place in considering the sufficiency of the complaint. The fact that the claim of the city has not been, or cannot be, established does not prove that it has not been clearly stated, and that is the only matter to be considered in ruling upon the demurrer.

Third.

The next proposition of appellants is stated in these terms: "If the court had any power to determine these questions at all in

this action, it was error not to determine those issues before submitting the cause to the jury."

To speak of submitting this cause to the jury is an inaccuracy which tends to confusion. By agreement of the parties only one issue in the cause was submitted to the jury, viz.: the question of damages. All other issues were tried by the court, and it was of no importance in what order they were decided except in so far as a determination of one point was necessary as a basis for the determination of another. Undoubtedly it was necessary that the jury should be correctly instructed as to the quantity and extent of the estate and interest of the defendants in the land in order that they might correctly estimate its value, and since from the nature of the rights in controversy and the agreement of the parties that point was to be decided by the court, it was necessary that the jury should be informed before retiring to consider of their verdict what the conclusion of the court was, but that conclusion could be stated as well before as after the filing of formal findings of fact and conclusions of law. These were an essential preliminary to the judgment but not to the instructions to the jury, and if the instructions actually given were correct and full the fact that findings had not been previously filed is of no consequence. Whether the conclusions of the court upon this point were sound and whether the jury was correctly instructed are points to be considered in another connection.

Fourth.

The next contention of appellants is that there is no authority in law for the condemnation of these three hundred and fifteen acres in fee-simple for the purposes for which the property is sought to be condemned.

An ordinance of the city of Los Angeles, approved on the 8th day of June, 1893, is attached to and made a part of the complaint. By its first section it ordained that it was necessary that the land in controversy "be acquired by condemnation for the purposes of constructing headworks for a water system." It will be seen that the purpose to which the land was to be devoted was not very definitely stated in the ordinance, but the amended complaint filed herein is somewhat more explicit and shows with reasonable clearness what the plan of the city is. The land is found to be saturated with water to within a few feet of the surface. It is proposed to construct a subsurface dam at the lower end of the tract. A subsurface dam, of course, would not have the effect of flooding the surface permanently, but it would permanently raise the plane of saturation. This being done, it is next proposed to tap this heavily saturated bed of sand and gravel by means of a tunnel connected with lateral galleries through which the water will be drained off and conducted to the supply pipes. In other words, the land is to be used as a reservoir, such as essentially it is, and none the less so because the water does not rise and stand above the surface. The
1116 evidence in the case shows that from one-fifth to one-third of the entire bulk of the material filling the valley below the plane of saturation is water. The land in its natural state, there-

fore, is a reservoir, and a subsurface dam is to be constructed in order to make it better serve the purposes of a reservoir. Such being the use to which it is to be devoted, the fee-simple may be taken. C. C. P., § 1239, Statutes of 1891, p. 102.

As to the necessity of taking the whole three hundred and fifteen acres the evidence is conflicting, and the finding of the superior court cannot be disturbed. The evidence introduced by the plaintiff showed that in view of the rapid increase of the population of the city the probable necessity of extending additional lateral galleries to obtain a larger flow of water, and to conform to changes in the channel of the surface stream, and the necessity of excluding live stock from the land to prevent contamination of the water, it was necessary that the city should have the exclusive ownership and control of the whole tract.

## Fifth.

Appellants next contend that the amount awarded by the jury as compensation for the tract condemned was not justified by the evidence. The jury found that the value of the defendants' interest in the three hundred and fifteen acre tract was twenty-three thousand dollars, and that their remaining land would be damaged two thousand dollars by the severance of the smaller parcel. Appellants concede that the evidence sustains this verdict if the value of the land for agricultural purposes is alone to be considered, but they claim that it is of enormously greater value by reason of the great quantity of water percolating in the soil, which, they contend, they have a right to collect and convey away to other lands for sale.

This claim of ownership of percolating waters is met by a claim on the part of the plaintiff that what the defendants call percolating waters are as truly a part of the Los Angeles river as the visible surface stream, and out of this contention arise the most important questions in the case.

There seems to be no substantial conflict in the evidence and no radical difference between the parties as to the character of the subsurface flow in the tract condemned. It is agreed that all the waters of the San Fernando valley, except what is lost by evaporation or consumed in plant life, flow out through the narrow pass between the eastern extremity of the Cahuenga range and the Verdugo hills, either on or beneath the surface, and there is abundant testimony to warrant the conclusion that at ordinary stages of the river the water flowing on the surface and that which is beneath the surface are in intimate contact and moving in the same direction. The land condemned is situated a short distance west of the narrow outlet of the valley, but the conditions, though differing slightly in degree, are substantially the same. The valley is somewhat wider, but there also the water on the surface and that beneath the surface are in contact and all flowing in the direction of the outlet—on the surface at the rate of two or three feet per second, under ground at an estimated rate of from fourteen to seventeen miles per annum. It appears, also, as stated above, that the Los Angeles river first appears as a surface stream a few miles west of the tract condemned, and

gradually increases in volume as it flows to the east. The fact of this gradual increase in the surface flow of the river, taken in connection with the other facts above detailed, would seem to warrant the inference that the waters of the San Fernando valley in seeking an outlet to the ocean flow under the surface as far as they can find room to pass through the boulders, sand and gravel which fill the space between the hills on either side, and gradually rise above the surface as the valley narrows and leaves less and less room for passage underneath. Much the larger portion of an extremely bulky record is filled with the evidence of expert witnesses in regard to the topography of the San Fernando valley, the material composing the valley proper, the amount of rainfall, measurements of surface flow, and a great variety of matters bearing upon this question of a subterranean stream. A careful study of this testimony, which though conflicting upon many important points is in reference to the larger and more general aspects of the case quite harmonious, convinces us that it is sufficient to sustain a finding in favor of the existence of a subterranean stream if the law with respect to subterranean streams was correctly laid down in the charge of the court to the jury. There can be little doubt, we think, that the jury under the instructions of the court, found that the subsurface flow in those lands was a part of the Los Angeles river and governed by the law of riparian ownership, or by a pueblo right still more favorable to the plaintiff. If this was the finding; and if it was made under correct instructions, it cannot be said that the award of compensation is unsustained by the evidence, for, aside from the water flowing in the subterranean portion of the stream as defined by the instructions, there is no evidence to prove the existence of any considerable quantity of percolating water in the tract condemned, and the same evidence which shows an inconsiderable quantity of such water tends strongly to prove that it could all be intercepted or drained by the owners of the adjoining lands before reaching the land taken. That is to say, if the defendants have the right to tunnel or trench their land below the plane of saturation for the purpose of draining off water which has not yet reached the surface, or subsurface, stream, their neighbors on the north have the same right, and, since only a very small portion of the three hundred and fifteen acre tract is higher than the bed of the stream, the percolating waters which they could drain without interference with the stream would be too inconsiderable in amount, and their right too precarious to add materially to the value of the land. Our conclusion on this point is that the verdict must stand if the jury were correctly instructed, and this brings us to the consideration of the most important questions involved in the case.

## Sixth.

A great many exceptions were taken to different instructions given by the court, and it is now insisted by appellants that the entire charge was in substance erroneous, and that the court erred in refusing to give the instructions requested by them because they presented the law correctly, while the instructions actually given

did not present it correctly. In view of the great number of exceptions to the charge on account not only of what it contains but of what it does not contain, there seems to be no more convenient method of presenting the points to be considered in this connection than by quoting very extensively from the record.

The court charged the jury as follows:

I.

"GENTLEMEN OF THE JURY: This is an action whereby the plaintiff seeks to condemn for public use all the right, title, interest and estate of the defendants in the lands described in the complaint. The land is situated in and on each side of the Los Angeles river several miles above and north of the city of Los Angeles. The questions arising in the case involving the right of the plaintiff to condemn the property, and the nature and extent of the defendants' estate and interest in the land to be taken, has been determined by the court. The only question you are to decide is the amount of compensation which the defendants are entitled to before their estate and interest in the land can be taken as proposed.

II.

"This compensation is to be composed of two parts or elements: first the value of the interest and estate of the defendants in the land described in the complaint; second, the amount of the dam-
1117 ages which will accrue to the other land of the defendants, which is part of the same parcel as the land to be taken, by reason of the severance of the land to be condemned and the construction of the works thereon as proposed by the plaintiff. For the purpose of assessing this compensation and damages the right is deemed to have accrued at the date of the summons, which is June 27, 1893, and the actual value at that date is the measure of value for all property taken, and the basis of damages for all property injuriously affected.

III.

"The defendants' estate in the lands in controversy is an estate in fee-simple, but it is subject to the right of the city of Los Angeles in the waters of the Los Angeles river. This river flows through the land to be condemned. If the city of Los Angeles had no interest in the river waters, then the defendants would have all the rights of riparian proprietors in those waters. As it is, their rights as riparian proprietors are impaired and diminished to the extent that the rights of the city affect those rights.

IV.

"The city of Los Angeles is situated on the river below these lands, and is the owner of the right to take from the Los Angeles river all the water that is reasonably necessary to give an ample supply for the use of its inhabitants and for all municipal uses and purposes for which the city may require water. This right is meas-

ured by the necessity, and if the needs increase in the future the right will expand to include all that the needs require. This right of the city is paramount and superior to the rights of the defendants in the waters of the river.

V.

"The defendants, therefore, have no right to so use or divert the water of the river as to diminish the same so that it will not furnish the amount needed for the supply of the city aforesaid, and, in determining the value of the land to be taken, this fact must be considered, and the value of the land for which defendants are entitled to compensation is its value subject to the above-stated right of the city.

VI.

"After the wants of the city are supplied, however, the defendants have the right to use the water of the river on their lands for any and every purpose which does not interfere with the equal rights or injure the lands of other riparian proprietors along the river above and below this land. These rights include a reasonable use of water of the river on the land for irrigation, domestic purposes, watering stock or other lawful purpose; also to obtain power by means of the fall of the stream on the land, returning the water to the stream before it leaves the land; also the benefit of having the water flow in its accustomed manner through the land. The right to use the water to irrigate the land through which it runs is subject to the condition that other riparian owners along the stream have the same right, and, if the water is not sufficient for all, neither has a right to use more than his reasonable share. All these rights are incident to the land because the river borders on the land; and they are not mere appurtenances, but are part and parcel of the land itself.

VII.

"In exercising this riparian right the defendants have no right to carry any of the waters of the Los Angeles river off of their riparian land for use on land not riparian, nor can they sell it for use on land not riparian; and all surplus waters must be turned back into the stream.

VIII.

"Rights in a subterranean water-course or stream are governed by the same rules as a surface stream of water; and the only rights that the defendants, as owners of the lands sought to be condemned, would have in any subterranean water-course flowing through their lands down to and through the lands of others (whether said stream flowed on such lower lands above the surface or beneath the surface of the ground) would be to make the same, but no other, use that they would be entitled to make had such waters flowed on the surface.

IX.

"A riparian proprietor is not entitled to divert (for any purpose except for purposes for which he is entitled to make use of on his

riparian lands as specified in these instructions) any portion of the waters of a water-course, or stream, whether surface or subterranean; and he cannot by any indirect means make such diversion where he would not have been authorized to do so directly.

"Therefore, a riparian proprietor cannot, by sinking tunnels or making other excavations under the sides or underneath the bed of such water-course, draw away for use on non-riparian lands any of the waters flowing in such water-course, although said excavations may not directly touch said stream; if, for instance, the water of stream percolates into the banks or bed thereof to a considerable but limited distance, and such percolating water is stationary, or has very little motion, said riparian proprietor would have no right to make an excavation so as to draw off said percolating water, if the effect would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn by such excavation, any more than if said excavation was made so as to tap said stream directly.

X.

"The mere fact that some of the subterranean water forming part of the stream on the lands sought to be condemned may be lost before reaching the point where the same would have gone into and made up part of the surface or subterranean stream of the Los Angeles river, would not give the defendants the right to divert an amount of said subterranean waters in said lands equal to or less than the amount so lost, if such diversion would have the effect of diminishing the waters, surface or subterranean, of the said river at any point above the south line of the pueblo lands of the city of Los Angeles.

XI.

"Whatever additional market value the land may have had by reason of these rights and advantages, so far as they do not interfere with or impair the rights of the city aforesaid, this value the defendants are entitled to as a part of the value of the land, before it can be taken; and this value you must include in your estimate of the value of the land sought to be condemned.

XII.

"In addition to these rights and benefits arising from the flow of the river through this land, the defendants are the absolute owners of all such water as may be present in the soil of this land and which does not constitute a part of the water of the river. This is usually called percolating water. There is, however, no magic in the word 'percolating,' and the fact that any witness may apply that word or refuse to apply it to any particular class of waters of which he may speak is not conclusive of the question whether or not such water does or does not form part of the river. That question is to be determined by you from a consideration of the facts proven. The right and ownership of the defendants

in this class of waters is distinct from and much greater than their right to the waters of the stream. As to the waters of the stream, they have a right only to the use of it on this land, and they do not own its corpus or its body, or the very water itself, and they have no right to take it away from the land and use it on other lands, or to sell or dispose of it for use on other lands or at other places. But as to this other water, if any there — in this land, not a part of the stream, they are the absolute owners of it, to the same extent and as fully as they own the soil, or the rocks or timber on the land.

1118 Therefore if, by any means, they can separate this water from the land, they have an absolute right to the water thus separated and may conduct it away and sell or dispose of it anywhere as they see fit, subject only to the limitation that they may not excavate or do anything on the land for the mere purpose of intercepting such water and preventing from flowing into the stream or water-course on the land of another and without intending to make any beneficial use of it themselves. Whatever additional market value this land may have had by reason of the presence therein of water of this class, or by reason of the feasibility of separating it from the land, or of using it on the land, or of conducting it to some other place for use or sale, or of the great market value of such water for such purposes, or by reason of all these things combined, or by reason of any other lawful benefit or advantage which this water gives, this additional market value inures to the benefit of the defendants and is a part of the compensation to which they are entitled in this case as the value of the land to be condemned.

XIII.

"It will be necessary, therefore, for you to determine what waters upon or in this land are a part of the waters of the stream, and what waters are not of the waters of the stream. This question is a question of fact to be determined by you from the evidence, under the instructions of the court.

XIV.

"The Los Angeles river is composed of its main stream and any branches it may have, whether surface or subterranean.

XV.

"While a water-course must have a bed and banks or sides, yet such bed may consist of any material which keeps the waters from penetrating below a certain depth, and such banks or sides may consist of any material which has the effect of confining the waters within circumscribed limits.

XVI.

"It does not always follow that water which does not flow on the surface in a visible stream is for that reason not a water-course, or not a part of the water of a stream which does at some place run on the surface; nor need it flow in a defined channel under ground as

a solid body of moving water of any particular dimensions in order to constitute a water-course.

"If you find from the evidence that there is a bed or a river bottom filled to a considerable depth with sand, gravel or other porous material, meandering over which a stream runs on the surface, and through and in which the water moves under ground, enough of it rising to the surface to supply the surface stream, and the other portions of the underground water moving with a much less velocity than the surface stream, and through a wider or larger space in and through the interstices of the porous material, but in the same general direction as the surface stream and in connection with it, and in a course and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy, then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface.

"If such water-course exists, it is immaterial, so far as the water-course is concerned, from or through what lands the waters flow in reaching the channel, or whether they reach the same by percolation or by clearly defined streams.

XVII.

"So, also, if you find that the water coming down on the surface in the streams known as the Tejunga, Little Tejunga and Pacoima creeks, in the northeastern portion of the watershed, is discharged on the plain known as the San Fernando basin, and there sinks in the sand, washes and flows down southwardly under ground through sand, gravel or other material easily permeable by water and along the courses and its channels which have been made by the streams of water from these same creeks flowing on the surface, but which channels were long ago filled up with this porous material; that these waters now flow in these channels beneath the surface to the land in controversy; that on this land there is a range of hills extending easterly and westerly, so as to change the course of these underground channels, and combine or collect the water into one general body of water and force the same to turn and move eastwardly in a similar channel through these lands, and on down along the general course of the Los Angeles river; that upon arriving at this land a portion of the water rises to the surface and flows above ground as the Los Angeles river, and the remainder flows under ground along in the same general direction, and in connection with the surface stream, in porous material formerly deposited by the same stream in its bed, then all this body of water, both above and below the ground, should be deemed a part of the same stream from its sources to its outlet.

XVIII.

"If the jury find that on the lands sought to be condemned there is situated the river bottom of the Los Angeles river extending the whole length of said land, and occupying nearly the whole thereof,

and containing all of the subterranean waters of said land, and filled to a considerable depth with permeable material, consisting of loam, sand, gravel and boulders mixed together and interspersed with irregular and broken strata masses or pockets of clay, and cemented sand or gravel, lying in place substantially as deposited by the forces of nature, and that as the same lies in place the natural voids or interstices of such material generally throughout the whole of said river bottom are equal to from one-fifth to one-third of the entire mass; and that the subterranean waters in said lands enter the same chiefly from the north and partly from the west sides thereof from lands composed of substantially the same materials as the lands sought to be condemned, said waters so entering under pressure caused by gravity; and that the south boundary of said river bottom is formed of an impermeable dyke of rock known as the Cahuenga hills; and said waters entering from said north side are prevented from continuing their flow to the south and are dammed up by said wall of rock, and that all of the subterranean waters in said river bottom are thereby forced to fill all of the said interstices and void places in the material of which said river bottom is composed to a height in some places equal to and in some places greater than the level of the surface stream of the river; and that there are no impenetrable and continuous barriers extending through the said mass in said river bottom in any direction so as to interrupt and prevent the substantial continuity and contact of all of said subterranean waters; and that some of said subterranean waters to the amount of about one thousand miners' inches constant flow, measured under a four-inch pressure, being so brought to the surface, enter into and form part of the surface stream of the Los Angeles river on said lands, so that the amount of said surface flow at the point where the same leaves said land on the east is increased by about one thousand inches over the amount of its surface flow at the point where it enters said land on the west; and that the remainder of said subterranean waters move under ground to the east although with a varying velocity and much slower than the said surface stream, but in the same general direction with it, off of the lands sought to be condemned and still continuing in and through the river bottom of the Los Angeles river, which is composed of like permeable material as aforesaid, and bounded and confined on the southerly, as it turns to the south, on the westerly side thereof by the same
1119 continuous dyke of rock; said waters still maintaining their substantial continuity; and that part of said waters rise from time to time as they flow in said river bottom and feed the surface flow of said river; and the remainder of said waters continue to move under ground in said river bottom as aforesaid; and that said waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom enters within the limits of the city of Los Angeles, crossing its northern boundary; then the jury must find that all of the subterranean waters contained in the land sought to be condemned are a part of the waters of the Los Angeles river.

XIX.

"On the other hand, the law is that innumerable little streams finding their way through the soil, or seeping or percolating through the material of which it is composed, do not become water-courses simply because the amount, when exposed, is visible.

"A water-course must consist of beds, banks or sides and water, and the water must be flowing in a channel or course more or less defined. It is not necessary that the water should flow continually, or at all times of the year, but neither is a mere swale, in which extraordinary freshets flow, sufficient to answer the definition. To maintain the right to a water-course or brook it must be made to appear that the water usually flows in a certain direction and in a regular channel, with banks or sides, though it need not to be in a straight line.

"Waters, whether under or above ground, having no certain general course or definite limits, such as those merely percolating through the strata of the earth and those diffused over its surface, are not water-courses, and are not subject to the rules of law applicable to water-courses.

"To entitle an underground stream to the consideration of the law, it is necessary that it be a water-course in the proper sense of the term. Percolations which spread themselves in every direction through the earth do not constitute water-courses.

"Water moving by force of gravity in a valley or basin of wide extent, say twenty-four by twelve miles at the extreme extent, and moving generally through the -hole or through a large portion of the basin, along through the natural voids or interstices of the earth, composed of alluvial or other deposit lying throughout the entire basin, and made up of loam, sand, gravel and boulders mixed together, and interspersed with irregular and broken strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, do not constitute a water-course, but are a part of the land and belong to the owner of the land as fully as any other constituent part of it.

XX.

"If you find from the evidence that the lands sought to be condemned are situated at the lower portion of and form a part of the San Fernando basin or watershed, near or at its outlet, and that said basin is about twenty-four miles long and about twelve miles wide at the widest point, and that said outlet is from two thousand feet to three miles wide, and bounded and defined on the southern side by the rock of the Cahuenga range and on its northern side by a similar rock of the Verdugo hills, and that the earth of which the basin is generally composed, including said outlet and the land sought to be condemned, is an alluvial or other deposit made up of loam, sand, gravel and boulders mixed together, and interspersed with broken or irregular strata or masses of clay or cemented sand and gravel, and lying in place as originally deposited by the forces of nature, and that as the same lies in place the natural voids or interstices of

such earth, generally throughout the basin, including the defendants' lands and said outlet, are equal to from one-fifth to one-third of the bulk of the entire mass, and that such entire deposit lies upon a grade or slope toward and through the outlet of such basin, and that all the water falling in the watershed of such basin, which is not lost in storm, run-off or by evaporation or in supporting plant life, or held immovable in the ground, sinks into the earth composing such basin, and thence by force of gravity moves down through such voids or natural interstices of the earth throughout the greater portion of the entire mass to the outlet of the basin, through which it passes, without forming anywhere in the mass any definite course or channel in which it can be ascertained with reasonable accuracy that such water is moving in greater quantities or with greater velocity than in other places, so as to be concentrated in a stream either above or below ground, then such waters so moving through such outlet, or through or in defendants' land in the natural voids or interstices of the earth, do not constitute a subterranean flowing stream or water-course, but they belong to the owner of the soil in which they may be found, and the portion of them which may be found in the land of the defendants are the property of the defendants. But if such water does collect under ground and flow in certain courses or channels through coarse, permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface, and although the space through which the channel extends may be largely filled with the material through which the water flows.

"The burden of proving that waters moving in the ground are flowing in a natural water-course or in a defined channel, or are a part of a stream, is upon the plaintiff in this action. The presumption is that they are not part of a stream or water-course nor flowing in a definite channel.

XXI.

"A stream which flows along and in a natural channel, at some places flowing on the surface and at some places sinking in porous material which has been deposited in and has filled the channel, and there passing down along in the same channel under ground and again rising to the surface and flowing as a surface stream, is no less a stream or water-course at the points where it flows under the surface than at the places where it runs on the surface. And if part of the water remains moving under ground at the places where the surface stream flows, all of the water, both above and below the surface, constitutes the stream. And if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material, forming the semblance of an underground lake or reservoir with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel and afterwards reappearing below as a surface stream, then the

water would be as much a part of the stream while it was contained in such underground lake or widened channel as while it was flowing on the surface.

"And, on the other hand, water which has not formed part of such stream and is not moving in such underground channel, but comes from surface water or from rains and floods sinking into the ground and passing through the soil by gravitation, having no general direction, although it may eventually find its way into some stream or water-course and materially add to the water thereof, yet while so passing through the ground it is not a stream or water-course, but is part of the soil and is the property of the owner thereof.

XXII.

"In determining the actual value of the land taken, you are to take into consideration all of those factors which enter into and make up its value; the altitude of the tract, the capability
1120 of taking to the city of Los Angeles and to the country east and west of it, by gravity, the waters which may be collected on said land, without taking the waters of the natural stream; the amount of water which can thus be collected; the fact that the land sought to be condemned is so situated as to constitute the best place along the Los Angeles river for obtaining a water supply and conducting the same either to the city or other tracts east and west of it; the needs of water in different places within the reach of this tract of land and of the water which may be thus collected thereon,—all are circumstances to be considered by you in determining its actual value.

XXIII.

"If the jury believe from the evidence that the subterranean waters in the land sought to be condemned are percolating without any definite channel, and that the same are not a subterranean water-course or stream, and if they believe that such waters come on to said lands from the lands of others above, or pass from the lands sought to be condemned down to the lands of others lying below, and that such upper proprietors could, by the construction of tunnels or other works, cut off or divert said waters, or some part thereof, from the lands sought to be condemned, or that such lower proprietors could construct tunnels or other works on the lands lying below the lands sought to be condemned, which would have the effect of draining or depriving the lands sought to be condemned of their subterranean waters, to the extent that the owners of the land sought to be condemned could not make a practical use thereof, or of some part of said waters, then the jury are instructed that such upper and lower proprietors would have the same rights so to appropriate said waters on their lands as the defendants would have on the lands sought to be condemned, and the jury must take those facts into consideration so far as they diminish or destroy the value of the rights of the defendants to said waters, or such portion thereof as could be so diverted or drained so as to deprive defendants of the practical use thereof."

We will now take up the specific objections of the defendants to these instructions in the order in which they are stated. The first is to instruction No. 10. It might be a sufficient answer to the objection now urged in the argument to say that it is not one of the objections stated at the trial and specified in the exception then taken. But, waiving that point, it seems clear to us that unless the entire theory of the instructions in regard to underground streams and percolating waters is wrong, this instruction is right, or at least is harmless. The fault found with it is that it denies the right of defendants to divert any part of the underflow on their lands, whether the water diverted would ever reach the surface stream or not. But the instruction is limited to subterranean water which is a part of the stream (as in other instructions defined), and if it is a part of the stream it cannot be diverted, whether it would come to the surface or not. It belongs to the stream and must flow on to the lower riparian proprietor. His right to the subsurface portion of the stream is identical with his right to the surface flow, and is entitled to the same protection. As to the criticism that the instruction is meaningless, it must be admitted that it does not clearly explain itself. But the respondent points out that it refers to a claim made by defendants that a large portion of the subsurface flow was somehow lost from the stream between their land and the city, and therefore they could divert an equal or smaller quantity without injury. If such a claim was made, the instruction was perhaps necessary—if it was not made, the instruction was harmless.

Counsel next criticise instruction No. 12, complaining that it confounds percolating waters and waters of the stream in such a manner as to render the court's view of the law absolutely unascertainable, and to give the jury to understand that, notwithstanding water may be percolating, it may still be a part of the stream. We think the meaning of this instruction is entirely clear, and that the only question is as to its soundness in point of law. The court certainly did intend in this instruction, and in many others, to tell the jury that water passing through the voids of any loose permeable material filling or partially obstructing the channel of a stream is still water of the stream. If it all sinks beneath the surface the whole stream is subterranean; if a part sinks and the remainder flows upon the surface, that which is invisible is as much a part of the stream as the surface flow. The difference between counsel and the superior court at this point seems to be that to them all water passing through sand, gravel and boulders is percolating water, and the mere fact of percolation is inconsistent with the idea of a stream, while to the court there is no such inconsistency when the material through which the water forces itself fills a well-defined channel with impervious sides and bed, through which a considerable body of water flows from its source to its resting place. If this view of the court is correct, the instruction is neither erroneous nor obscure.

The quotations made by counsel from instructions number 13, 14, 15, 16, 17, 18, and their criticisms thereon, are all directed to the proposition that the court understood and intended the jury to

understand that nothing is essential to the constitution of a subterranean stream except that the general direction of the flow of the water is discoverable. That in this sense the whole San Fernando valley is a subterranean stream, and the jury might as well have been instructed in terms to find that there was in this land no percolating water, the property of the defendants. We do not think the instructions referred to, taken by themselves, necessarily bear this construction, and certainly when considered in connection with those numbered 19 and 20, and others, it clearly appears that the court was not giving, or intending to give, a definition which would make the whole San Fernando basin a subterranean stream. The instructions, taken altogether, are applicable in their definition of a subterranean stream exclusively to the comparatively narrow outlet of the valley between the Cahuenga range and the Verdugo hills, where all agree that the entire rainfall of the valley passes out, partly on and partly beneath the surface, between the rocky and comparatively impervious mountain sides on either hand. It is true this pass, on the surface, is from one and a half to two and a half miles in width, and that in it borings have been made over a hundred feet in depth before encountering bed rock, but here is not only water moving in a definite direction, but also sides and bed to the channel in which it is moving, and these, also, are comprehended in the court's definition of a subterranean stream. Another objection to these instructions, particularly to number XVI, is that they charge the jury upon questions of fact. We cannot see that these instructions are at all objectionable upon this ground. What a subterranean stream must be in order to bring it within the law of riparian rights is a question of law, and the entire scope of these instructions includes nothing but a statement of the facts which the jury must find from the evidence in order to determine whether there is a subterranean stream, and, if so, how much of the water in the land is part of that stream. This is in nowise a transgression of the province of the court. Another objection to several of these instructions is that there was no evidence upon which to base them. We think, however, that there is not only some evidence but very substantial evidence contained in the record tending to prove every material portion of the various hypotheses stated in the instructions.

Before proceeding to a consideration of the numerous exceptions of the appellants to the rulings of the superior court upon the
1121 instructions requested by them, it will be convenient to first dispose of the main question in the case, viz: The proper definition of a subterranean stream.

There is no dispute between the parties and no conflict in the authorities as to the proposition that subterranean streams flowing through known and definite channels are governed by the same rules that apply to surface streams. The cases in which this and cognate questions have been raised and decided are innumerable, and it would be an endless task to review or even to name them. No case involving directly the rights of parties in subterranean streams has been decided in this court, but the law, as applicable to

the present case, is well epitomized in section 48 of Kinney on Irrigation, as follows:

"Subterranean or underground water-courses are, as their names indicate, those water currents that flow under the surface of the earth. A large portion of the great plains and valleys of the mountainous regions of the West is underlaid by a stratum of water-bearing sand and gravel, and fed by the water from the mountain drainage. This water-bearing stratum is of great thickness, the water is moving freely through it, is practically inexhaustible, and, if it can be brought to the surface, will irrigate a large portion of the country overlying it. In and near the mountains many streams have a bed which was originally a rocky cañon, but has been filled up with boulders and coarse gravel. In this debris a large portion or all of the water sinks from sight, to reappear only when some rocky reef crosses the channel and forces the water to the surface. The movement of this water through the porous gravel, owing to the declivity of the stream, is often quite rapid, and a considerable volume may thus pass down the channel hidden from sight.

"These water-courses are divided into two distinct classes—those whose channels are known or defined, and those unknown and undefined. It is necessary to bear this distinction in mind in our discussion, as they are governed by entirely different principles of law. And in this connection it will be well to say that the word 'defined' means a contracted and bounded channel, though the course of the stream may be undefined by human knowledge; and the word 'known' refers to knowledge of the course of the stream by reasonable inference. Regarding the laws governing these two classes, it must be known that if underground currents of water flow in well-defined and known channels, the course of which can be distinctly traced, they are governed by the same rules of law that govern streams flowing upon the surface of the earth.

"The owner of land under which a stream flows can, therefore, maintain an action for the diversion of it if such diversion takes place under the same circumstances as would enable him to recover if the stream had been wholly above ground. But for this purpose the underground water must flow in known and well-defined channels, so as to constitute regular and constant streams, in order that the riparian owner or appropriator may invoke the same rules as are applied to surface streams, or otherwise the presumption will be that they have their sources in the ordinary percolations through the soil. This rule practically disposes of the second class of subterranean waters—those whose channels are unknown and undefined—although there are undoubtedly a great many underground streams whose waters flow in confined channels but whose courses are not known, and, following the above rule, these are all classed with percolating waters."

The point to be specially noted here is the meaning ascribed to the words "defined" and "known." "Defined means a contracted and bounded channel, though the course of the stream may be undefined by human knowledge; and the word known refers to knowledge of the course of the stream by reasonable inference."

In this case the boundaries of the channel and the existence and course of the underground stream were unknown and undefined except so far as they could be inferred, but there was a great amount of evidence from which a reasonable inference could be drawn that the channel was bounded and defined by the sloping sides of the Cahuenga and Verdugo hills meeting under ground, and that there was a subsurface flow corresponding with the surface flow from west to east out through the gap. Without any excavation beneath the surface, or other test or experiment, all this could be inferred from the topography of the country, the amount of rainfall and the gradually augmenting volume of the surface stream in its approach to the narrowest point in the pass. And the court was certainly justified in submitting to the jury the question whether the subsurface flow was a part of the stream, unless the mere fact that it was forcing its way through sand and gravel and boulders deprived it of the character of a stream.

Upon this point we are satisfied that the view of the superior court was the reasonable and just view and not opposed to anything that has ever been decided in this court.

This is in fact the pioneer case of its kind, so far as this court is concerned. There have been cases here in which injunctions were sought to prevent owners of land from digging or trenching or tunnelling in their own premises, upon the ground that they were cutting off the subterranean sources of springs and streams, and they have been uniformly decided in accordance with the accepted doctrine as to rights in percolating waters—the doctrine which defendants contend is applicable here. Those most nearly in point and most relied on are Hanson *vs.* McCue, 43 Cal., 178; S. P. R. R. Co. *vs.* Dufour, 95 Cal., 615, and Gould *vs.* Eaton, 111 Cal., 639. But in none of these cases was there any evidence comparable to the evidence here of an underground stream.

Gould *vs.* Eaton comes nearer to this case than either of the others, but in that case it was found by the lower court that the portion of the water as to which there was any controversy was merely feeding the stream by percolation. And even in that case, which went as far as any case has ever gone in favor of the doctrine that percolating waters are a part of the soil and belong to the owner of the land, it was conceded, if not decided, that no water can be abstracted from a surface stream by tunnelling beneath it, notwithstanding the water must pass from stream to tunnel by percolation, or filtration through the soil. In this case there is a great amount of evidence tending to prove that the defendants could not take any material quantity of water out of their land without abstracting an equivalent amount from the surface stream, the reason being that the water of the surface stream would necessarily sink into the loose porous material underneath to fill the voids occasioned by the drawing off of the water from below. This, however, is a matter involved in another aspect of the case, the present inquiry relating exclusively to the proper definition of a subterranean stream. Upon this point we hold that the instructions of the court contain a sound and correct statement of the law as it applies and ought to apply to

streams of the character of the Los Angeles river. To hold otherwise would be destructive of rights long supposed to be certain and assured. Upon the doctrine contended for by defendants the whole of the Los Angeles river could be diverted from the city and the sole water supply of a community of over a hundred thousand people completely cut off. For it is not alone the defendants who own water-bearing lands in the San Fernando valley, and if they can abstract and convey to distant points the water in the land sought to be condemned others can do the same thing. There would be nothing to prevent the driving of tunnels through the Cahuenga range at a dozen points and tapping the water below the level of the surface
1122 stream, in such a manner that by extending filtration galleries in sufficient number the whole flow of the river could be abstracted. Once concede that the defendants may draw off the subsurface flow, or any part of it, the same privilege must be conceded to others, and the man or the corporation that can put in the largest tunnel at the lowest level will get the lion's share, while the inhabitants of Los Angeles will get none. The doctrine, therefore, while ruinous to those who have built up a populous and prosperous city upon the faith that they were secure of a supply of water for domestic and municipal purposes, would afford no security to the defendants or to any one in their situation, for what they could take from the city others could take from them.

We come now to consider the instructions asked by defendants and refused by the court.

There was no error in refusing instructions 15, 16, 17 and 18 (ff. 4179, *et seq.*), for they had been given substantially in the charge of the court.

Instruction No. 19 was refused as misleading. We do not see how the jury could have been misled by this instruction as requested, but it, like the others, had been given in substance and without any improper qualification, and therefore it was not prejudicial error to refuse it. The instructions 20 to 25 inclusive were all properly refused upon the grounds stated by the court. They all related to percolating waters and subterranean streams, and, so far as correct, had been given in substance. Instruction 31 had been given in substance, and its refusal is justified upon that ground. No. 32 was not law. Nos. 34 and 35 were given in a modified form in instructions Nos. 19 and 20, above quoted. These modifications were certainly proper, and probably necessary to prevent misunderstanding. No. 36 was properly refused as containing the propositions which the modifications just referred to were designed to exclude. It declared that the question of percolating waters or running streams is not affected by the fact that the subsurface flow has a definite direction corresponding with that of the surface flow, etc. These facts do very materially affect the question in this case, and would deserve serious consideration in any case. Instruction No. 33, requested by defendants, contains a sound proposition, viz: that no act of the legislature of California can diminish or change the rights of the defendants in these lands derived from their predecessors, the Mexican and Spanish grantees. But this was a ques-

tion with which the jury had nothing to do. The court had determined the rights of plaintiff as successor to the pueblo, and had instructed the jury what those rights were; whether its instructions on this point were correct is a matter to be considered when we come to those instructions, but whether correct or incorrect they necessarily controlled the verdict of the jury to the exclusion of all questions as to the effect of the acts of the legislature.

## Seventh.

We come now to another series of instructions given and refused relating to the rights of the plaintiff as successor to the pueblo.

It must be borne in mind that this was one of the issues in the case which by agreement of the parties was tried by the court. The instructions given to the jury on this point are, therefore, to be regarded as embodying the findings and conclusions of the court upon that particular issue, and treated accordingly, the only question being whether the decision of the court as to the extent of the city's right in the waters of the river is sustained by the evidence. Instructions 3 to 6, above quoted, embody the views of the court as stated to the jury, and it is claimed that they are erroneous in several particulars. It is still more strongly insisted that the court erred in refusing instructions 12, 13 and 14, requested by defendants, which read as follows:

### XII.

"The rights of the ancient pueblo of Los Angeles, whatever they may have been, were not attempted to be granted by the legislature to the city of Los Angeles, except to the extent of four square miles, and could not under any circumstances have extended beyond four square leagues.

### XIII.

"The uses to which the pueblo was authorized to apply the water was such purposes as appertained to the Spanish pueblo, under the civilization of those times, and it did not extend to the cultivation and irrigation of parks, or the creation and maintenance of artificial lakes therein, or supplying waters for an outfall sewer.

### XIV.

"The said pueblo of Los Angeles had no paramount rights to the use of the waters for any purpose, as against those grantees of the Mexican government under whom the defendants here claim; but the raising of stock, and tilling the land, granted by the Mexican government to these grantees, were as much parts of the policy of the Spanish and Mexican government, as the founding of pueblos and promoting the progress of those towns. And rights to the use of water by the grantees of these ranchos for domestic uses, and stock and agricultural purposes, were protected by the laws and policies of those governments, as well as the interests of inhabitants of towns."

In discussing this branch of the case it will not be necessary to take up seriatim the particular exceptions reserved by the defendants to the giving and refusal of these various instructions. It will be sufficient to consider a few general propositions to which they give rise.

The pueblo of Los Angeles embraced four square leagues (something more than seventeen thousand acres) of land. The city of Los Angeles as originally incorporated embraced the same area, but, by successive amendments to its charter, its area has been about doubled by the addition of lands outside of, but contiguous to, the original pueblo. Within the city several parks have been laid out in which there are artificial lakes of considerable size, with lawns and shrubberies requiring irrigation. An outfall sewer has been constructed, through which the sewage of the whole city is carried to the Pacific ocean, requiring a large amount of water; the population of the city exceeds a hundred thousand and it is rapidly increasing.

The defendants hold their lands as successors to several Spanish and Mexican grantees, under patents from the United States based upon the original grants. They claim that, even conceding the rights of the pueblo and the city's succession to those rights (a concession which they make only for the purposes of the argument on this point), they are still, by virtue of their ownership of the lands in question, entitled to the exercise of full riparian rights, except so far, and so far only, as those rights are impaired by the paramount rights of the pueblo as they existed before the change of flag and without any legislative addition thereto.

This claim, we think, is clearly just. The legislature of California could grant nothing to the city of Los Angeles which belonged to others, and the rights of the city, as successor to the pueblo, in the lands of riparian proprietors holding under Mexican and Spanish grants, cannot exceed the rights of the pueblo itself.

This being so, the facts above detailed regarding the growth and extension of the city, and the municipal uses to which it is applying the water drawn from the river, give rise to the questions upon which the charge of the court and the instructions requested by the defendants so radically differ.

By instruction number 4, above quoted, I understand the court to have charged the jury that the defendants had no right
1123 as owners of these lands to take any water from the river for irrigation, watering stock, or even for domestic purposes, if by so doing they would deprive the inhabitants of the present or future city of Los Angeles of an ample supply for all domestic and municipal purposes.

I think this instruction is erroneous. If the paramount right of the city is only the right of the old pueblo, to which it succeeded, I cannot see how such right covers the requirements of that large portion of the present city outside of the four leagues constituting the pueblo. The inhabitants of that limited territory, to whatever number they may increase, enjoy the full pueblo right, but beyond that territory the right does not extend. The city, of course, has the

power to provide water for all its inhabitants and for all public purposes throughout its extended limits, but if, in order to supply the territory outside of the pueblo boundaries, it finds itself compelled to encroach upon the riparian rights of land-owners along the river, it ought to pay for those rights the same as for any other private property taken for a public use.

This is not the same proposition involved in the case of The Vernon Irrigation Co. *vs.* Los Angeles, 106 Cal., 237, but it is governed by the same principle, and that case is authority, if authority were required, for my conclusion upon this point.

As to the public purposes for which the city may use water in the exercise of its paramount right, the question is not of such easy solution. The view of the defendants is set forth in the instructions requested by them, numbered 13 and 14, *supra*. Number 14 I think erroneous, because it denies to the pueblo any paramount right for any purpose. And number 13, I think, is also erroneous in limiting too strictly the purposes for which the city, as successor to the pueblo, has a paramount right to the use of the water of the river. It is certain that irrigation of the pueblo lands was one of the purposes for which the pueblo could take the water, and the fact that some of those lands have been converted into ornamental parks does not impair the right to irrigate them. An outfall sewer is something which I suppose was never contemplated in the foundation of a Spanish or Mexican pueblo, but this was because the modern system of water supply for domestic purposes and modern methods of house drainage were then unknown. These improvements have made an outfall sewer necessary for the health and convenience of the inhabitants of Los Angeles, and since the water was granted or dedicated as much for the health and convenience of the pueblo as for any other purpose, and since it has been practically settled that the pueblo right expands with the increasing needs of the inhabitants, the right to drain the city by means of an outfall sewer, and to keep the sewer in a state of efficiency by the necessary flushing, must be held to be fairly within the pueblo right.

But the maintenance of artificial lakes, by which undoubtedly a large quantity of water is lost through absorption and evaporation, never was necessary for the support or health or convenience of the inhabitants of a pueblo, however much it might have contributed to their pleasure, and I know of no principle upon which their right to use the waters of a river for such a purpose could have been deemed paramount to the ordinary rights of riparian proprietors. It was not only the policy of the Spanish and Mexican authorities to foster the growth of the pueblos, but also to encourage the raising of stock and other rural industries to which the use of water for domestic purposes, the watering of stock and irrigation were essential, and it is not to be believed that in the primitive condition of society in those times, when the settlement of the country and the support of its inhabitants was the primary consideration, the most favored pueblo would have been allowed to consume in the maintenance of ornamental fountains and artificial lakes water necessary to the sustenance of an essential branch of industry.

## Eighth.

But the appellants go still further, and contend that when the land in controversy was granted to their predecessors there was no pueblo of Los Angeles, and consequently no pueblo right to which any of their rights could be subordinated. This contention is based upon certain executive orders of departmental officials made in pursuance of a Mexican law of 1837, by which the pueblos containing less than a certain minimum of population were deprived of their ayuntamientos. Under the law the ayuntamiento of Los Angeles was abolished, or suspended for a time. But we do not understand that the pueblo was extinguished, or its rights to the waters of the river at all impaired by the abolition of the ayuntamiento. The only result was that its affairs were administered by a prefect, or other officer appointed by the central authority, instead of by a local council. This question, however, ought to be considered closed by the previous decisions of this court in the Vernon Irrigation Company's case and others. All of the laws and public documents upon which its solution depends are within the judicial cognizance of the courts, and whether they were actually noticed or not in previous decisions they must be deemed to have been considered and allowed their due weight. The question is one of law, rather than of fact, and its decision in one case is a precedent in others.

## Ninth.

Another series of the instructions given and refused deals with the measure of compensation applicable generally in condemnation suits. Of the instructions above quoted, those numbered 2, 11, 22 and 23 relate to this matter. Exceptions were taken to these instructions, and also to each of the following:

### XXV.

"In determining the actual value at the date of the summons you are not to take, as the measure of that value, what an owner could realize at a forced sale, but the price he could obtain, after reasonable and ample time, such as would ordinarily be taken by an owner to make sale of like property; and in making that estimate you should consider the use for which the property is suitable, having regard to the existing business or wants of the community, or such as might have been reasonably expected in the immediate future. You will also consider the fitness of this land for agriculture, and its value for that purpose, and for fruit or stock raising, for the timber growing on it, as well as the water which may be in the soil, not a part of the river; and from these and all other uses to which the property may be put from which profit may be derived, and from all the evidence on the subject, you will determine its actual market value at that date.

### XXVI.

"The market value of the land is not necessarily the value of the land in its present or prospective use to the owner; nor is it the value

which it would be to the city as a location for headworks; nor the sum which the city must be compelled to give for it by reason of the necessity it may be under to obtain it; nor is it the sum that could be derived from the land for any special purpose for which it may be suitable. All these things, if shown by the evidence, may be considered as bearing on the question, but only so far as it may appear that they affect the actual market value at the date of the summons, and the thing you are to determine is such actual market value at the date stated.

XXVII.

"Although you may believe from the evidence that by reason of things done, discovered or ascertained since June 27, 1893, it now appears that the land was then more valuable for any purpose or use than it was then known to be; yet you cannot consider such additional value unless you believe also that these things were sufficiently known or obvious in June, 1893, to affect the market value at that time, and did so affect it.

1124 XXVIII.

" If the jury find that any of the underground waters of the lands sought to be condemned are not a part of the waters of the Los Angeles river, they can consider that fact in fixing compensation only so far as it tended, if at all, to affect the actual market value of the land at the date of issuing the summons, disregarding any acts done upon the lands or information acquired concerning said waters since said date.

XXIX.

" You are entitled to consider the evidence regarding the quantity of subterranean waters in the lands in question, and their value, only in arriving at a just determination of the market value of the lands sought to be condemned on the 27th day of June, 1893; wherefore, if you believe that said waters did not give said lands an additional market value at that date, or that if an additional market value were given but the same did not equal the real value of said waters, then you must place on said lands a valuation equal only to the market value which they then had, including such additional market value which said waters gave to said lands, irrespective of the true value of said waters.

" If, for instance, said lands could not have been sold in the market on said date (the owners having had abundant time to find a purchaser, such as would generally be taken by an owner trying to sell like property) for more than a certain sum, then you must not find the value of said lands to be greater than said sum, although in fact you may believe that the waters in said lands made them worth more than that sum."

One of the objections to these instructions which the appellants urge in the argument here is directed against the charge repeated in several places that the value of the property at the date of the

summons must control. The hardships of this rule, when applied to a case in which so long a time elapses between the issuance of summons and the trial of the cause, as happened in this instance, are strongly stated by counsel, and their argument against the constitutionality of this feature of the statute would not be undeserving of consideration if they were in a position to urge it. But the fact is this portion of the charge was given in form and in substance as they requested it in the instructions proposed by themselves, and they cannot, therefore, claim that the court erred in allowing it.

Another objection is that the court confuses "actual value," which is the true measure of compensation (constitution, art. 1, § 14, and C. C. P., § 1249), with "market value" and "actual market value," in such a way that the different instructions are either self-contradictory or unmeaning. We do not think the instructions are self-contradictory, and their meaning we take to be this: "Actual value" is the measure of compensation, but "market value" is the criterion of actual value, and the definition of market value is given in the instructions numbered 25, 26, etc. If, then, these instructions lay down a correct rule for ascertaining actual value, the charge as a whole is not erroneous. In most respects the charge is sustained by previous decisions of this court (San Diego *vs.* Neale, 78 Cal., 63; Spring V. W. W. *vs.* Drinkhouse, 92 Cal., 528). But there is one objection strongly urged in this case which was not involved and could not have been considered in any case formerly decided here.

In several of these instructions the jury are told in effect that in estimating the value of these lands they must not take into consideration any fact discovered since the summons was issued. In other words, to use the illustration put by appellants, if a gold mine worth millions of dollars had been discovered in this land the day after the issuance of summons, the city could take the land by paying its value for agricultural purposes.

This conclusion, it is true, follows logically from the proposition that market value at the date of the summons is to control, and that is the idea upon which the instructions are based. But I think this is a mistaken idea. The thing to be ascertained is not market value, but actual value (C. C. P., § 1249), and the only reason why market value is taken as the criterion of compensation in ordinary cases is because it is in such cases the true measure of actual value—the only practical test. But in a case where discoveries made after the issuance of summons demonstrate that the actual intrinsic value of the land at that date was greater than its market value—in other words, when it appears that market value is no criterion of actual value—those discoveries should be taken into consideration. As such discoveries were claimed in this case, I think the court erred in giving and refusing the instructions referred to.

## Tenth.

The giving of instruction 9 is complained of upon the ground that there was no evidence upon which to base it. Unless we have greatly misunderstood the defendants' position the instruction meets one of their claims to percolating waters, but if they do not claim

the right to undermine the surface stream and draw off its waters the instruction did them no harm. It stated the law correctly.

And so, also, does instruction 23 lay down a correct rule clearly applicable to the case. The point for the jury to determine was the value given to these lands by percolating waters not a part of the stream—waters which the owners of the land had a right to convey to a distance for sale. In considering the value of such waters it was certainly material to consider at the same time whether the defendant might not at any moment be wholly deprived of them by the exercise on the part of others of the same right in their lands claimed by defendants with respect to their own.

Instruction number 29, requested by defendants, and refused by the court, has so remote an application to the questions to be decided by the jury that its refusal cannot be deemed an error.

Instruction number 33, requested by defendants, was properly refused, because it related in great part to the issues to be determined by the court.

Instructions 34, 35 and 36, requested by the defendants, were given in a modified form, and the modifications were proper.

## Eleventh.

A great many exceptions were taken to rulings of the court on objections to testimony and documentary evidence.

Some of the questions raised by these exceptions have been practically decided in discussing other points. As to the rest it is sufficient to say that, although some evidence was admitted that does not appear to have been clearly relevant, it could not have been prejudicial. The evidence actually admitted without objection took a wide range, and the most of the objections were to questions asked of expert witnesses on cross-examination. In respect to such questions the court is necessarily invested with a large discretion. In this case some objections were sustained that might have been overruled without error, and some were overruled that might have been sustained; but we cannot see that the court abused its discretion in any instance, or that it would have made an appreciable difference in the result if the ruling had been the reverse of what it was.

## Twelfth.

It is contended that the evidence is insufficient to justify the verdict of the jury or the findings of the court.

Since the conclusions above stated involve a retrial of the issue submitted to the jury, I deem it unnecessary to notice the first branch of this proposition, and my remarks will be confined to the second.

Does the evidence sustain the findings upon the issues tried by the court?

I think that there is substantial evidence to sustain every
1125 finding that is material. The taking of the three hundred and fifteen acres may not have been shown to be absolutely and certainly essential for the supply of the present needs of the

city, but, in view of the rapid increase of its population and its probable increase in the future, in view of the possible necessity of enlarging the number and of changing the location of the filtration galleries, in order to insure an ample supply of water at all times, and for every emergency, the court was justified in finding that it was a wise and prudent measure to secure the entire tract. And there was evidence to sustain the finding that unless the city had the exclusive control of the surface there was at least a possible danger that the water supply might be polluted by stock herded or pastured there. This, however, is not very material, because it bears only upon the question of taking a fee-simple estate, and the right to take such estate rests securely upon the fact that the land is taken for a reservoir.

The third finding, which relates to the paramount right of the city as successor to the pueblo, is sustained by the evidence, except in so far as it carries the meaning of those portions of the instructions above considered which are pronounced erroneous.

The evidence does not show any formal adoption by the city, prior to the commencement of the action, of the detailed plan of these headworks alleged in the complaint, but it does show a previous adoption of engineer's report recommending in general outline and in all essentials the plan here set forth in detail. It shows also, by a series of resolutions and orders of the council a fixed purpose on the part of the city to own and control its own system of water supply, and a resolution of the council directing the city attorney to commence this proceeding as soon as the ordinance of June 8, 1893, should be signed by the mayor. This probably accounts for the rather precipitate action of the city attorney in filing the complaint the same day that the ordinance was passed and before its publication. This, however, would have been but an irregularity in the absence of the resolution. The object of publishing laws and ordinances before they take effect is to warn those who are to be bound by their provisions. In a case like this, where an ordinance has been duly passed and an order for its publication has been duly made, the act of an officer obeying its directions, in anticipation of its publication, is at least ratified and made good when the publication is complete. Moreover, in this particular class of cases the action is not commenced until the summons is issued. C. C. P., § 1243; Pac. Coast R'y Co. *vs.* Porter, 74 Cal., 261.

It appears, also, that since the commencement of the action it has been followed by other orders and resolutions of the council providing means for carrying out the proposed plan and complying with the terms of the judgment sought. In view of all these facts the objection that the action was commenced without authority in pursuance of a plan not formally adopted seems too purely technical to be regarded.

Other specifications under this head relate to findings of facts merely probative, included in the issue submitted to the jury, and need not be further considered.

## Thirteenth.

At the beginning of the trial of this action the parties made an arrangement with the official reporter out of court, in pursuance of which he furnished each of them a daily transcript of his notes at an agreed rate of compensation. The cost of defendants' copy was $767.45, and this sum they included in their bill of costs. On motion to retax the item was stricken out by the court. This is assigned as error, and section 274 of the Code of Civil Procedure, as amended in 1885, is cited in support of the assignment. But this amendment has been held unconstitutional (Smith *vs.* Strother, 68 Cal., 194), and the case is governed by section 274, as amended in 1880 and construed in Barkley *vs.* Copeland, 86 Cal., 493. The court did not err in this ruling.

For the reasons stated in the foregoing opinion I think the judgment and order of the superior court should be reversed, and the cause remanded for a new trial as to the single issue of compensation and damages—the issue, that is to say, which was submitted to the jury on the former trial.

BEATTY, *C. J.*

I concur in the views expressed by the chief justice, except as to that part of the opinion in which certain rulings made by the trial court are declared erroneous.

1. The first has regard to the time when the property is to be valued. The statute declares that the right to the property shall be deemed to accrue at the date of the summons, "and its actual value at that date shall be the measure of compensation."

The chief justice concedes that ordinarily market value is the true measure and the only practical test of the actual value, still, "in a case where discoveries made after the issuance of summons demonstrate that the actual intrinsic value of the land, at that date, was greater than its market value—in other words, when it appears that market value is no criterion of actual value—those discoveries should be taken into consideration." Such discoveries are claimed in this case. § 1249, C. C. P.

It is said if a gold mine worth millions of dollars had been discovered in this land the day after summons was issued, the city could take the land by paying its value for agricultural purposes.

The supposition is an impossible one. A gold mine of the known actual value of millions could not be so discovered. The phrase "actual value" is here used in opposition to the phrase "market value." It is difficult to give any meaning to it when so used, but in regard to a gold mine it must have reference to the amount which could be taken out of it over and above the cost of extraction. This could not be known until the mine was worked out, and therefore whenever it was valued necessarily the value could not be the actual intrinsic value, as defined, but would necessarily be its market value. So the proposed value only changes the statutory date at which the right of the city is deemed to accrue, and when the value is to be estimated. It is contended that the right must

be deemed to have accrued and the valuation be made after other elements of value have been discovered.

The phrase actual value is sometimes used in contradistinction to market value to indicate that property is valued too high to make it a good investment. If the market value of the land was one hundred dollars per acre, it would not be permissible to show that the real or actual value was less and that the market value was inflated. The owner could get the market value and less would not make him whole. The Government can take private property for its uses at any time conditioned only that the public shall compensate the owner, that it shall pay what it is worth when taken. This value must be the market or exchange value, for there can be no other. Value, which determines the price at which the owner must sell, must be the exchange or market value, and actual value means actual market value.

2. It is said the paramount right of the city to the water of the river does not extend to water required for residents in that part of the city which is not within the boundaries of the pueblo, and that the court erred in charging the jury, in substance, that all riparian rights were subordinate to the right of the inhabitants of the present and future city to the use of water for all domestic and municipal purposes.

It is argued that the city has succeeded to the rights of the old pueblo, and its rights cannot exceed the rights of the pueblo itself. If so, I do not see how the city can take water even for that portion of the city which is within the ancient boundaries, for uses which were not only unknown to the inhabitants of the pueblo, but which,
owing to the plan of the settlement, could not have been
1126 thought of as possible uses. Relatively only a small portion
of the territory was devoted to building lots. Provision was made for agricultural and pastoral pursuits, and large portions of the territory were laid out in montes, wood lots, dehesas, commons for cattle, ejidos, places for threshing grain, and recreation, and many other tracts were kept for the community. But this was a plan for a primitive village, to aid and encourage the settlement of the country. The sites for pueblos were carefully chosen in pursuance of the royal regulations of Spain, whose policy was that the government should determine where towns and cities should be built. Unquestionably it was contemplated and hoped that at least some of them would so prosper as to outgrow the simple form of the rural village. It is in the nature of things that this might happen, and when it did, and the communal lands were required for house lots, we must presume that under Mexican or Spanish rule they could be so converted, and that when the population increased so as to overflow the limits of the pueblo that such extension could be legally accomplished. Had this happened under Mexican rule, can it be doubted that the right vested in the pueblo would have been construed to be for the benefit of the population, however great the increase would be?

I cannot see why the interpretation of the original grant should be more narrow than of a title acquired by condemnation. If the

city should now in this proceeding purchase the riparian rights for the use of the city, must it do so again whenever its present limits may be enlarged?

Suppose in 1850 the little city then existing had condemned for its use all riparian rights, and had no other right to the water. The extent of a taking by condemnation is always limited to the necessity which justifies it. That which is not used still belongs to the owner. The title to water would not be acquired, but only the use, and as against the riparian owners, in such a case, the city could not have taken water not needed by the city and its inhabitants. In 1850 the city contained only a small population, and its corporate limits were less even than the pueblo limit. In the supposed case could the land-owners now contend that the larger city could not, under the right acquired in the condemnation proceedings, supply the inhabitants of the additional territory? As to such a claim I think there would be but one opinion, and that would be that in the condemnation proceedings all possibilities as to the future growth and requirements of the city were taken into consideration.

3. I have never been able to see anything in the objections to the outfall sewer. It seems to me if the city cannot maintain this it cannot be a city at all and retain the water rights of the pueblo.

4. The last matter of difference relates to water used in the ponds and artificial lakes. The real objection to this seems to be that it looks like extravagance or waste. We feel that where water is so precious it should not be used for mere matters of taste and fancy, while those who need it for useful purposes go without.

In the forum of morals this may be so, but the needs of a city are understood to include such uses as well as for the supply of absolute necessities. It would be intolerable to invest in outside authority a right to superintend and limit such uses. While, therefore, I am not prepared to say that the discretion of the municipal authorities could not under any circumstances be interfered with, I do not see how we can do so here. It is clearly a municipal use which is familiar in municipal history.

The judgment and order are affirmed.

TEMPLE, *J.*

We concur:

McFARLAND, *J.*
HENSHAW, *J.*
GAROUTTE, *J.*
HARRISON, *J.*

1127 L. A., No. 419.

In the Supreme Court of the State of California.

THE CITY OF LOS ANGELES, Plaintiff and Respondent,
*vs.*
A. E. POMEROY and J. D. HOOKER, Defendants and Appellants.

*Petition for Rehearing.*

H. H. F. Variel, John G. North, J. S. Chapman, attorneys for appellants.

Filed June *Jun* 20 1899 *1899.*

G. W. ROOT, *Clerk*,
By —— —— *Deputy.*

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1129 In the Supreme Court of the State of California.

THE CITY OF LOS ANGELES, Plaintiff and Respondent,
*vs.*
A. E. POMEROY and J. D. HOOKER, Appellants.
} L. A., No. 419.

To the honorable supreme court of the State of California:

The appellants, A. E. Pomeroy and J. D. Hooker, respectfully petition the court for a rehearing in this cause.

The questions involved herein are numerous, and scarce require to be each specifically stated, but, stating them generally, they are:

1. Had the court below jurisdiction to determine questions of title to the property sought to be condemned?

1130 2. Did it determine them before the cause was submitted to the jury?

3. Can a fee-simple estate be condemned for the purposes for which this condemnation was sought?

4. Can the condemnation of 314 acres of land be justified for those purposes?

5. What is the nature and character of the subterranean waters in the land in controversy?

6. To whom did they belong?

And, incidental to these questions—

7. The correctness of the various instructions of the court.

8. The nature and extent of the right of the city of Los Angeles as a successor of the pueblo.

9. The correctness of the rulings of the court on certain questions of evidence.

This cause was originally heard before the court in bank, at the October term at Los Angeles, in 1897. It was submitted then upon oral arguments and somewhat elaborate briefs. Subsequently, and nearly a year afterwards, no decision having been rendered, the cause was resubmitted and reargued at the October term in 1898, and again submitted. The year 1898 wore away, and one of the justices of this court who had heard both arguments, retired from the bench, his term having expired, and another judge took his place who had not heard either of the arguments. The cause remained undecided until the 3rd day of June, 1899, when the opinion of the court and the decision thereon was filed.

1131 Under such circumstances, ordinarily, it would be with extreme reluctance that we should approach the court again for a further consideration of the questions in controversy; it would seem like leading a forlorn hope, and would appear so much like wearying the court with importunity, that we should feel much diffidence in attempting to impose upon a tribunal sufficiently burdened already, a still further argument upon those questions; but in this case it seems to us that in spite of all the arguments and briefs in the cause, some facts have been overlooked, and some questions have not been presented with all the clearness of which the subject is susceptible, and which we cannot help thinking, if presented distinctly, would lead to a different result.

Furthermore, there is much in the opinions filed in this cause themselves, to say nothing of anything else, that suggests the thought that, notwithstanding the long time during which the cause has been under consideration, the views of the court upon some questions involved herein have undergone a change within a very recent period, and that portions of the opinion, at least, were written when a different conclusion was thought to follow.

The first opinion appearing in this case, written by the honorable chief justice, reaches the conclusion that the judgment should be reversed, and this is followed by a brief opinion which occupies the place usually of a dissenting opinion, but which is concurred in by five of the six justices participating in the decision.

1132 Again, on page 49 of the two typewritten copies of the opinion in our possession, and in the twelfth paragraph of the opinion, occurs the following:

"Twelfth. It is contended that the evidence is insufficient to justify the verdict of the jury or the findings of the court. Since the conclusions above stated involve a retrial of the issues submitted to the jury, I deem it unnecessary to notice the first branch of this proposition, and my remarks will be confined to the second."

This language seems to anticipate a different result from that which followed.

But these are not the only suggestions of a modification of the court's views, but on the contrary, in the opinion delivered on the 5th day of May, 1899, Los Angeles City Water Company cases, the court, speaking by Mr. Justice McFarland, said:

"The court below, when appointing a receiver to collect the water rates and enjoin the water company from collecting such rates, seems to have laid stress upon the consideration that the city was the owner of the water of the Los Angeles river which was used through the water works of the water company. It seems to have been determined, however, that the city has only the right to the use of such an amount of the water of the river as is necessary to supply the wants of its citizens and of the municipality; it has not the right of a riparian owner to have the water of the stream flow as it is accustomed to flow without any regard to its use. It is entitled to the use of the water only when it is in a position to use it, and
1133 could not recover damages for its diversion except when it was in a position to use it; and it is apparent that it is not in such position, for it is not in possession of any system of water works through which such use could be exercised."

These remarks, which appear to us to be at variance with the decision in the present case, were on the same day that the opinion was filed herein, expunged.

It is true that that action was put upon the sole ground that the above-quoted remarks were unnecessary to the decision. It may be conceded that the two opinions upon this particular subject are not irreconcilable. But the fact that it was unnecessary was never discovered by our learned antagonists until the opinion of the court had been obtained upon it.

It was insisted in the complaint in that action, that the city was the owner of the water. The same thing was insisted in the case of the Crystal Springs Land and Water Company against the city.

In the brief filed in the case by the counsel for the city, at pages 28 to 30, they set forth very elaborately what is charged and what is denied upon the subject of the ownership of the water.

The ownership of the water is again asserted in the brief at page 53. In fact, throughout the brief, wherever the question was discussed in which the water was concerned at all, the ownership of the city, absolute, complete and entire, is either directly asserted, or assumed. In any case, where the decision of one of a dozen questions would lead to the same judgment, it might
1134 be said of any eleven of them that they are unnecessary to the decision. Of course in the decision of the receivership case, it would not be denied that the decision of the rights of the water was not absolutely essential to the determination of any ques-

tion involved in it, for that appeal was from orders made at the beginning of the various actions, of preliminary injunctions, and on the appointment of a receiver; the actual merits of the case were not only not involved in their entirety, but the evidence upon which some material questions involved has not yet been taken; nevertheless this modification of the opinion, coming as it did at the same time with the decision in the Pomeroy and Hooker case, not unnaturally makes the same suggestion of a change of view, and especially as the dissenting opinion, if we may speak of it as such, or the opinion which does not concur with the chief justice in his views of the pueblo rights, was signed by the same five justices who delivered and signed the opinion in the receivership case. We trust, therefore, that we may be pardoned if we are affected with the feeling that some authority, some treatise, or discourse not before that time brought to the attention of the court, has put the matter in a new light before the court, or led the court into new lines of reasoning upon some of the questions here involved. What those suggestions were, we of course have no means of knowing, other than as they seem to be revealed with more or less distinctness in the two opinions which are filed in this case.

1135 The only means which the law or rules of the court provide us for a reargument along these new lines of thought, is through a petition for a rehearing. It is mainly for that purpose, and partly to restate, we trust with more clearness, some positions for which we have previously contended, this petition is presented.

We proceed, now, to consider the questions.

## I.

### Concerning the power to try questions of title in a proceeding for the condemnation of property.

We do not understand that the opinion questions the propositions, that a proceeding for the condemnation of property is a statutory proceeding; that the right exists only when it is given by the statute, and it must be exercised in the mode pointed out in the statute. We do not understand that it is denied that the authorities which we have cited to prove that the action of condemnation cannot be turned into a suit to quiet title, do go a long way to support that proposition.

As we understand, the grounds upon which a conclusion is reached contrary to that for which we had contended, is, that the statute here does authorize the trial of adverse claims; that a different construction of our statutory proceeding is too narrow, and that great public inconvenience would result from such a construction.

A statutory authority for such a controversy was contended by our adversaries to be found in C. C. P., sec. 1247, subdivision 2.

We contended that this was an authority to determine adverse 1136 claims only as between the defendants; that the purpose of a condemnation suit was to condemn the whole interest, the whole property, if a fee-simple is sought; that the question as

to who is entitled to the proceeds, is one which does not really concern the plaintiff; that the object of his action is to ascertain the amount which he is to pay, and pay it, and then the court can determine who is entitled to it.

In the opinion in this case the learned chief justice says, on page 6 in the copy which we have:

"It is true the express provision above quoted (from sec. 1247) applies only to the conflicting claims of those who are named, or who make themselves defendants in the proceeding. But this is only because the interests of the defendants alone are to be condemned. The statute does not contemplate the condemnation of an interest which the plaintiff already has, or the payment of any damages except to those whose property is to be taken away, and therefore the plaintiff can have no concern in the condemnation of adverse or conflicting claims to the property sought to be condemned and the damages therefor. But although this provision of the statute has no direct bearing on the question here presented, it contains an express legislative recognition of the entire competency of the court to try and determine adverse claims to the property in a proceeding to condemn." (Pp. 6 and 7.)

But if it does not apply at all to controversies between plaintiff and defendant, how is it a legislative recognition of the competency of the court to try and determine adverse or conflicting claims? If it does authorize the determination of such an adverse claim, why does it not bear directly upon the question? If the authority
1137 is not found in that subdivision two, for a pleading on the part of the plaintiff tendering an issue upon its own title, it is not to be found anywhere in the statute. Nay, there is much in the statute which negatives any such proposition. Section 1244 prescribes what the complaint must contain. It is:

1. The name of the corporation, etc., charged with the public use for which the property is sought, who must be styled plaintiff.

2. The names of all owners and claimants of the property, if known, or a statement that they are not known, who must be styled defendants.

3. A statement of the rights of the plaintiff.

4. Certain special provisions where right of way is sought.

5. A description of each piece of land sought to be taken, and whether the same includes the whole or only a part of an entire parcel or tract. All parcels lying in a county and required for the same public use, may be included in the same or separate proceedings, at the option of the plaintiff; but the court may consolidate or separate them to suit the convenience of parties.

Now, in the purported description of each piece of land sought to be taken in this complaint, there comes by way of exclusion, a claim on the part of the plaintiff to the ownership of that which constituted the chief value of this land.

Because it comes by way of exception of something out of
1138 the land, does not make any the less a tender to the defendants of an issue upon this very question of ownership. In-

deed, if the court were one of competent jurisdiction at all, we could not leave it undenied without admitting it.

Now, whatever may be said on the score of public convenience, it is submitted that the public convenience cannot override a private right. Either the jurisdiction existed or it did not. It cannot arise, through the very great convenience it may be to the public, that such a power should have existed. And as the power is not, at least, expressly conferred in this statute, we are unable to see why the authorities cited, which are confessedly not to be got rid of except upon the supposition that the statutes were different, or the questions arose in a different way, conclusive.

We maintain that neither a legislative recognition nor a direct legislative authority can confer any such power.

This trial of the so-called adverse claim between the defendants themselves is a different thing entirely. Even as between them, the power may be questionable; but it is obvious that in a condemnation proceeding the defendants are concerned, not so much for their interests in the land as their interests in the compensation paid for it.

Now it has been held many times that an agreement between parties to share in the proceeds of the sales of lands, is not an agreement for an interest in the lands within the statute of frauds. If a trustee were created to sell lands and divide the proceeds between certain parties according to their shares in the land, in an action for an accounting of those proceeds and a distribution of the funds
1139 after the land had been sold, if there were controversies between the parties as to the extent of their respective interests, it might be said, in some sense that it involved the trial of adverse claims to the land; yet not in such sense as that question is involved here. And yet it is plain that the statutory provisions are dealing with a cognate case to that which we have last supposed.

Says the constitution of this State:

"The superior court shall have original jurisdiction in all cases in equity, and in all cases at law which involve the title or possession of real property; * * * in all criminal cases amounting to felony, and cases of misdemeanor not otherwise provided for, in actions of forcible entry and detainer, of proceedings in insolvency, of actions to prevent or abate a nuisance, of all matters of probate, of divorce and annullment of marriage, and of all such special cases and proceedings as are not otherwise provided for."

Constitution, art. 5 sec. 6.

Thus it will be seen that the superior court would have jurisdiction of the proceedings in eminent domain, unless they were otherwise provided for.

Under our statute there is something more than failure to provide for it, for in section 1243 there is the legislative declaration that the proceedings must be brought in the superior court. Undoubtedly it would be perfectly competent for the legislature to prescribe some other tribunal, or create one, for the purpose of ascertaining the compensation to be paid for property taken for a public use. Would it be contended for one moment that the legislature could con-

fer upon such other tribunal the power to try the title to the
1140 lands sought to be condemned, as between plaintiff and defendant? If the legislature should confer upon justices of the peace the jurisdiction over proceedings for condemnation, could it at the same time clothe it with the power to determine the title to the land? But the answer here is, the proceeding all takes place in the same court. That is true, but it is none the less a special proceeding. If it be a suit to quiet title, it is a case in equity; if it be not some sort of a case in equity to determine the title, then it is a case in law involving the title or possession to real property; and in either case the jurisdiction is given to the superior court of the county where the property is situated

Now the fact that the court in which the special proceeding is taken is the same court which by the constitutional provision above referred to is clothed with the jurisdiction to try and determine titles, can make no difference. If section 1243, which declares that the proceeding under this title must be brought in the superior court, were amended by striking out "superior court" and inserting some other, or create a tribunal, would it make any difference in the interpretation of the remaining sections of the title prescribing the proceeding in cases of eminent domain? We say not. The name of the court in which the proceeding is to be brought, cannot have the effect of giving a different meaning to all of the remaining language in that title.

This question is not new, nor strange. Superior courts have jurisdiction in actions of forcible entry and detainer, so have
1141 the justices' courts in some cases. The superior court has appellate jurisdiction from the justice court; but it was held, where an action of forcible entry and detainer is brought in the justice court and appealed to the superior court, if there is no jurisdiction in the justice's court, there is none in the superior court.

Ballerino *vs.* Bigelow, 90 Cal., 500.

If the action had been originally brought there, it would have had jurisdiction, but that did not affect its appellate jurisdiction.

In Estate of Burton, 64 Cal., 428, the court said:

"It is competent for the probate court to examine into the title to a given parcel of real estate * * * as a basis for the exercise of its discretion in selecting one parcel or the other for the homestead; but for the purpose of adjudicating upon the title of adverse claimants, it has no jurisdiction."

To the same effect:

*In re* Groome, 94 Cal., 69;
Noble *vs.* Superior Court, 109 Cal., 527, 528.

Yet this other forum was the same superior court.

Bath *vs.* Valdez, 70 Cal., 360;
Barnard *vs.* Wilson, 74 Cal., 517.

The probate court may order the surviving partners to account, but if the account is not satisfactory the jurisdiction of the probate

court ends, and the suit for an accounting must be on the equity side of the superior court.

Theller *vs.* Such, 57 Cal., 459, 461.

1142 To the same effect:

Andrade *vs.* Superior Court, 75 Cal., 462, 464.

The probate jurisdiction of the superior court is separate and distinct from its jurisdiction in ordinary civil action, and it has no jurisdiction in settlement of the accounts of a guardian after the death of the guardian without a settlement in the probate court. The jurisdiction is in a court of equity.

Guardianship of Allgier, *et al.*, 65 Cal., 228.

To the same effect:

*In re* Rose, 80 Cal., 174.

Guardianship of Kincaid, 120 Cal., 203.

Yet this court of equity to which one must apply in such cases, is the same superior court; nor can the superior court in an action of ejectment set aside the land sought to be recovered, as a homestead for the benefit of minor heirs.

Richards *vs.* Wetmore, 66 Cal., 365.

That can only be done by the superior court sitting as a court of probate.

*Ib.*

Yet it is the same superior court.

So it is submitted that there is nothing new nor strange in the proposition that the superior court, sitting in a special proceeding for the condemnation of property, cannot exercise its general superior court power of determining controversies in regard to title.

Now in the opinion (pp. 7 and 8), after asking why the necessity of circuity of action, the learned chief justice says:

1143 "Both branches of the controversy would in any event be tried and determined in the same forum, and there seems to be no good reason why they may not be litigated in one action. Even if the adverse claim of the plaintiff were first determined in an action to quiet title, its subsequent assertion in a proceeding to condemn, whether admitted or contested, would be just as foreign to any express provision of the statute as if his right had never been determined. It follows, therefore, that the argument that the court can do nothing in these proceedings except that which is in terms authorized by the statute, proves too much. It would not only debar the plaintiff from proceeding before his title had been adjudicated, but would debar him always."

We cannot help thinking that the supposed difficulty here stated has largely influenced, if it has not controlled, the decision upon this question. But now, with deference, let us suggest what we think is the complete answer.

It is true that if the claim of the plaintiff had been adjudicated in an action to quiet title, its subsequent assertion in a proceeding to

condemn, whether admitted or contested, would be foreign to any express provision of the statute; but why? Why, because the plaintiff has no business to state anything in a complaint for condemnation about his own title. He has no express authority to set up his own title there at all. What his complaint is to contain, so far as property is concerned, is that which he is seeking to condemn. An allegation in the complaint that the plaintiff owns something is not authorized by the statute; if it be set forth, it is irrelevant.

1144 But the fact that he does not set it forth does not debar him, either before or after the action, to quiet title. Let us illustrate.

A person being entitled to maintain a condemnation proceeding, seeks to condemn a particular tract of land. B. claims to own it; A. claims that he is tenant in common, owning one-half of it. The person seeking to condemn investigates the title, satisfies himself that A. does own one-half, buys it from him at an agreed price, and takes his deed. Not agreeing with B. on the price, he brings a suit to condemn what? Why, the one-half—not that which he claims to be his own. If he is mistaken in the title, to be sure he would not get anything more than he condemned, to wit, the one-half. That is the consequence. If he wants to have a determination of what interest he got by his deed from A. before paying B., his remedy is in action to quiet title, or some action by which his title is determined.

If we are correct in this, the next consequence stated would not follow. That is, in a proceeding to condemn, it would not be true that the jury called to try the question of damages would require instructions as to the nature and quantity of outstanding interests remaining in the defendants.

The plaintiff is the one to allege what it is that he desires to condemn. If he brings a suit against A. to condemn the fee-simple, gets the judgment, the amount fixed, and pays the award, this would not conclude anybody not a party to the action. And so if he sues one party, stating what interest it is that he desires to condemn, and condemns it, and pays for it, and that same party's

1145 interest is greater than that which is condemned, he is not concluded by it. And if the plaintiff in condemnation assumes that he has gotten in the case the supposed one-half from A. by deed, and the other half from B. by condemnation, and undertakes to assert his right to the whole, B. would not be concluded from contesting it with him in a proper action and in a court of competent jurisdiction.

The next point made is based upon considerations of great public inconvenience. We have already said that such considerations cannot overrule private rights.

Now, if we understand the point, it is admitted that under other statutes that have existed in this State, this right of determining adverse claims did not exist. It is certainly admitted that among the authorities which we have cited many of them have sustained our proposition, that a proceeding for condemnation of property is not one into which can be injected an action to quiet title. Such is the

general rule, and we think we hazard nothing in saying that if our statute authorizes it, it stands as an exception, and we insist that the statute cannot authorize it; that the constitutional jurisdiction over actions involving the title or possession of real property cannot be set aside by legislative enactments which would assume to turn over to another forum the power to do that which the constitution says resides only in the superior court, and that, too, in cases involving the title, not special proceedings to condemn it.

1146 By the acts under which some of the cases which your honors have considered in this matter, the jurisdiction in cases of eminent domain *were* vested in the county court, and possibly in the county judge. At that time the constitution invested the jurisdiction over cases involving the title or possession of real property in the district courts. Could the legislature have then invested the county court, or county judge with jurisdiction such as is claimed to belong to the superior court here in proceedings of eminent domain? Certainly not. This whole argument, therefore, must rest upon the single proposition that because, forsooth, by the accidents of the present law, the jurisdiction over proceedings in eminent domain is in the same court that has jurisdiction of actions to quiet title, the title may be determined in the same proceedings. Would the court hold the converse of this, viz., that in a suit to quiet title the property could be condemned? We have endeavored to show that this accident cannot change the interpretation of the statute.

In Moffat's case, 7 Cal., 577, where it was held that the commissioners appointed to assess the value of the property had nothing to do with the settlement of adverse claims, it simply held that parties in possession of land are entitled to compensation before it can be taken for public use; that the parties in possession were presumed to be the owners, and that the court had no right to withhold the value of the land because the commissioners reported that Gillespie and Mesick claimed that land, they not being parties to the suit; and there is no inconsistency between that

1147 and the Spring Valley Water Works case, 22 Cal., 434, arising under the same act, for the question there was altogether different. The commissioners found the value of the land and reported the amount. It is claimed that they erred in not allowing the parties to prove their respective claims set up by them to the land. The supreme court said that they did not err, that they were not selected for any other purpose than to determine the value; it was no part of their duties to hear evidence and to determine the right, title and interest of each claimant, whether such claims were conflicting or not; that the court, or judge before whom the proceedings were conducted, and not the commissioners, is the proper tribunal to determine such questions.

It will thus be seen that the point there decided was that the commissioners could not determine adverse titles, and had no power over them at all, and it would have made no difference if the parties agreed among themselves on the share of each. It was not, under that act, the function of the commissioners to determine any-

thing about it. They reported the gross value of the land to the court, and then after that, as between the parties to the suit who were making different claims, the court heard them and apportioned the money. But the court in that case did not intimate that a controverted question between the plaintiff and the defendants, or any of them, respecting the title, could be determined in such an action.

Wilcox *vs.* The City of Oakland, 49 Cal., 29, is said to con-
1148 tain a dictum in line with the decision in these two cases, to the effect that the commissioners had no power to try questions of adverse titles. It is a dictum only in this, that the court held that it had no jurisdiction in that proceeding at all, which was an application for a writ of certiorari; hence anything may be said to be a dictum except to dismiss the proceedings. But, nevertheless, the question upon which this dictum was expressed was involved in the original proceeding.

In San Jose *vs.* Freyschlag, 56 Cal., 8, it is said that the court remarking *obiter*, that if the plaintiff had alleged the dedication it would have stated itself out of court, as it would thus have shown the existence of the only right it could have acquired by the proceeding to condemn. It is true that the question was not raised in the pleadings, and it could have been disposed of without that remark, but was not the remark correct?

Eminent domain is the right of the people or government to take private property for public use.

C. C. P., sec. 1237.

The whole theory of the statute, and of the proceeding everywhere, is that somebody has something which it is desirable to condemn and take for public use. If, therefore the plaintiff in such a proceeding alleges that he has already got it, would anybody claim that the complaint could be sustained? Or if he alleges that he has the only right, privilege or easement in it which he desires to take, would not that end the action?

1149 We come now to the attempt to distinguish the present case from others by showing that the question here is different. The pleadings, say the court in this case, distinctly allege that the defendants have a certain interest in the lands to be condemned, but not the whole interest. They show, in other words, that there is something to be condemned, and what that something is, and clearly make the issue which the court is to try.

The first part of this is objectionable, but the latter, wherein they clearly made the issue on this title which the court was to try, is exactly what we object to. They framed the issue in such a manner that the question of title necessarily had to be determined, and we can add nothing to what we have already said in support of our objection to it.

Whenever a judgment is given which determines the title of real property, or anything else for that matter, there should be the means of determining just what is settled. If any sort of an action involving the title to real property, whether it be legal or equitable, is brought under the laws of this country, the parties both have the

right to know what the court or jury determines in respect to it. If they have not, it is not an action involving the title or possession of real property. If they have, it cannot be presented in this proceeding, but must be presented in a court of competent jurisdiction, in the manner pointed out by the law.

Take this case. There was evidence here (we will say for the present moment, and in view of this opinion) upon which the jury might have found anything. They might have found that
1150 there was not a drop of water flowing underneath this land that was of any consequence whatever. It was testified by Mr. Purcell that the measure of the contents of this so-called reservoir was about five thousand inches of water, all of which was represented by the surface flow at the northern boundary of the city of Los Angeles. It was testified by others that the mountain watershed should yield nineteen thousand inches, measured under a four-inch pressure. Which one of them did the jury believe? There was evidence in this case that the land for agricultural purposes was not worth exceeding $10,000, and our impression is there is evidence that it was even less than that. There is evidence of other experts in the matter that it was worth over $40,000. How do we know which one of them the jury believed? Suppose they were of the opinion that the value of the land for agricultural purposes was seven, eight, or ten thousand dollars, and that all the water that there is flowing under ground was not worth over $13,000, the value of $23,000 is made up. And there was evidence from which they might have found the value of that water to be a million and a half.

Now, what do we know and what can we know as to what the jury actually did find upon this matter? That the water was percolating? That the defendants did not own it and the city did? Or that the defendants did own it, but the value was no more than they said?

Take away the findings of this court, and present this verdict of the jury and a judgment entered thereon, produce it before
1151 any court could that court ever tell what had been decided with respect to the title of the property? Certainly not.

And so with the issues which were presented to the court under the stipulation. Suppose we had not stipulated; then certainly whatever is triable in this case is triable before the jury.

C. C. P., sec. 1248, subdivision 1.

Suppose it had been thus tried, would the record then disclose what the jury had found with respect to the extent of any pueblo rights? The extent of the city's ownership of the waters of the Los Angeles river? Either the Los Angeles river proper or this basin which is at once a river, a lake, and a reservoir, according to the exigencies of one question of another. We say not.

We went to the trial before the court under a stipulation which reserved the objection. The mere fact that the method of trial enabled us to arrive at some greater certainty with respect to these matters, though it is by no means certain yet, does not change

the question which we are contending for. We were driven to the trial, and we certainly waived nothing by then making the best shift we could. We might have refused to stipulate, in which event it would have gone before the jury, and with the result which we have stated. There would have been an action to quiet title, or an action to determine adverse claims between the plaintiffs on the one hand, and the defendants on the other, terminating in a judgment which would have disclosed nothing whatever as to what conclusion had been reached upon that controversy.

1152 We add again, what we have elaborated to the best of our ability in the briefs already filed, that the court's oral discourse as to what would be determined, and the court's instructions, and the court's findings, do not agree. The findings upon this subject are at folios 227 to 230, pages 57 and 58. The oral opinion on this subject is at folios 1251 to 1255. The instructions are numerous, and the three different modes of expressing the opinion of the court upon this subject do not give the same idea of the rights of the city and of the defendant; and the comments upon this in the brief of the appellants, are at pages 32 to 34.

Aliso Water Company *vs.* Baker, 95 Cal., 269, is distinguished from this case upon the theory that in the complaint in this action is given a description of the land. The objection to the complaint in that case was that the description was not sufficient. We say that the demurrer to this complaint ought to have been sustained upon the same ground. But the answer is, that the description is sufficient. How sufficient? Why, by inserting in the complaint a statement of the plaintiff's ownership of a certain property interest in these lands. Now, in any suit, could a question of title be involved by a mere description of the property? If at any point in the complaint in any sort of an action the plaintiff describes certain property, but says nothing more about titles, no question of title either would, or could, be involved. That which the statute requires is a description of the property, which is totally distinct from the statement of any-

1153 body's right, title or interest in it; and the assertion that the plaintiff owns a certain interest in the property, does not aid in the description in the least, and if it did, if it is mere description, it does not raise the question of title. But this complaint did raise the question. And when that allegation of ownership was denied, the pleadings did not enable the jury to know precisely what was to be considered in estimating the damages; but left it largely to the jury in spite of the stipulation, to determine, first, what is the description of the property which we are to value; secondly, what is the value of it? Now, the meaning of the term "description of property," is not ambiguous. When the complaint is required to state a description of the property, it does not mean that the jury is to make the description by its verdict, nor the court by its findings. The question as to whether the description is sufficient never could arise on a complaint, if we must wait for the findings or verdict to know what the description is. The demurrer, we submit, ought to have been sustained.

II.

Upon the subject discussed in the fourth subdivision of the opinion, the right to condemn the 314 acres in fee-simple, we shall not remark further than is already discussed in the brief, except to say this—that in overruling our contention it seems to be put entirely upon that part of the complaint, which claims to be condemning the land for reservoir purposes, for we scarce think that what is said about the tunnels and lateral galleries, and the necessity of running other galleries, could make any difference in this question,
1154 even if everything contained in the opinion, or contended for by the plaintiff, were true.

If the plaintiff had the right to condemn in anticipation of the needs of this city for a century to come, and the possibility of extending these laterals could be provided for, what difference would that make in the nature of the estate to be taken, from the estate taken for the tunnels and laterals as now projected? Are these tunnels and laterals for the purpose of draining that water from the land easements on the land, or would it give a fee-simple? If it does not confer the latter, the extension would not confer it.

In other words, whether it be done in the present or the future, whether the power to extend these laterals for twenty-five years, or any other time, in any direction in this 314 acres of land were given or not, still the character of the estate would be the same. It would be an easement merely, and not the fee-simple. This whole pretence of the necessity of extending these galleries is a mere sham, and its ridiculousness becomes only the more manifest if this opinion becomes the final law of this case.

What is the Los Angeles river? Is it the San Fernando valley from mountain to mountain? Pray how is it going to shift its bed? Some mighty convulsion of nature, to be sure, might change the whole aspect of things in that country; but let the general topographical features remain what they are, and the very pretension in this complaint of the danger of the shifting of the river channel is the complete refutation of the claim as to what constitutes that channel. We shall deal, therefore, only with this reservoir and dam.

One of the things for which the fee-simple may be taken, is for reservoirs and dams.

The complaint alleges that it will be necessary for the purposes aforesaid, for plaintiff to construct on said land sufficient collecting chambers, tunnels, filtration galleries, settling reservoirs or
1155 basins, submerged dams, and other works, to divert all of the waters of said river on said lands, and for the purposes aforesaid it will be necessary to and plaintiff will, as soon as the said lands are acquired by it, construct thereon a submerged dam, settling basins or reservoirs, filtration galleries and tunnels, designated on the map hereunto annexed, marked "Exhibit B," as submerged dams, etc. Transcript, folios 71 and 73.

Now, as to the submerged dam. The only thing appearing on this map is at the eastern extremity of the main gallery or tunnel, and running out in a northerly direction; a line above it is marked at

one place "Old dam," and just beneath it "Sub. dam." The scale of this plat, or diagram, is twenty chains to the inch. The length of this submerged dam is stated at 1,170 feet. This river channel, it is claimed, is there two and — half to three and a half miles wide. The first lateral must be, according to the scale, somewhere from thirteen to fifteen hundred feet west of it. It is perfectly obvious, therefore, that the submerged dam is a myth, and can serve no purpose whatever under the heavens, and the testimony in this case showed that fact.

Testimony Newman, fols. 885–888.
Testimony Friel, fols, 929–932, 944–946.

It is impossible that by such a submerged dam at that place the water could be backed up, either the underground flow or the surface flow, to an extent that would make any difference in the amount of water that would flow i[illegible] the tunnel or the main gallery, which is over eight thousand feet in length.

As to the reservoir, the term is there used right in connection with settling basins in such a way that it is evident that the party meant the same thing; it is settling basins or reservoirs. The settling basin, however, which is referred to in the complaint, that is, by reference to the annexed diagram, will be found just above this submerged dam, and a little to the north of the line of the main
1156 tunnel, and just below the first lateral, that is, just to the east. It is marked on the diagram, and it can be seen exactly what it covers. It probably does not cover altogether two acres of ground. The submerged dam would not cover any more; and even if a settling basin could be called a reservoir, which it is not, and this so-called submerged dam can be called a dam, which it is not, still the whole space of ground occupied by both, will not equal five acres. Is that any excuse for condemning the fee-simple to 314 acres of land?

If there be any ground for this claim, it must be found in that remark in the opinion to the effect that the land in its natural state, therefore, is a reservoir, and a submerged dam is to be constructed in order to make it better serve the purposes of a reservoir.

It is plain that in delivering this portion of the opinion, the learned chief justice must have had in his thought, and, indeed, he expressly declares that this subsurface dam would raise the plane of saturation permanently. But it is submitted that it would not. The fall of that land is such that a subsurface dam could not raise the plane of saturation five hundred feet west of it without bringing the water to the surface, and it would flow over the surface. Besides that, as it does not extend one-fifteenth of the distance across the saturated plane, if the waters were backed up the half of five hundred feet, they would find their way off around the ends of the subsurface dam. It is impossible that this dam would raise the plane of saturation for any considerable distance back; and such distance as it did raise it, would not make any appreciable difference in the amount of water in the main tunnel. It must, therefore, be because the land in its natural state is a reservoir, that

this condemnation of the fee-simple is to be justified. But, it is submitted, that this is neither a correct construction of the statute, nor can it be harmonized with the opinion in this case.

1157 "The fee-simple may be taken for public buildings, or grounds, or for permanent buildings, for reservoirs and dams and permanent flooding occasioned thereby, or for an outlet for a flow," etc. C. C. P., sec. 1239. Sec. 1.

Now, that that section supposes the construction of something, is too obvious for argument. Any man's land in which percolating water is found is a reservoir in the same sense that this land is a reservoir; and if, because the material of this land is saturated with water it thereby becomes a reservoir, in any sense, it is not in the sense of the statute, which entitles the plaintiff to condemn the fee-simple. Besides that, if the land whose solid material is saturated with water is a reservoir, why does not the owner of the land own the reservoir? And in what conceivable sense can the same thing which is a reservoir for the purpose of condemning the fee-simple be a water-course for the purpose of determining the rights of riparian owners, or anybody else, in the waters of a stream?

The opinion shows that this whole San Fernando valley is a reservoir in exactly the same sense. Surely this statute cannot be construed as clothing the city, or anybody else, with the right to condemn the fee-simple of this whole valley because, forsooth, it is a reservoir. It is for the purpose of constructing artificial and permanent structures that this fee-simple can be condemned; and it is submitted that no reason that has yet been assigned, is sufficient to justify the condemnation of the fee-simple to this 314 acres of land.

## III.

We come to the more important question which involves the character and ownership of the waters, and the adequacy of the compensation here provided.

It seems to be conceded in the opinion that the amount awarded by the jury is grossly inadequate, if our claim to the ownership of these waters is well founded. It is conceded also, that there is no substantial conflict in the evidence, and no radical difference

1158 between the parties as to the character of the subsurface flow in the tract condemned. Then follows a statement by the court of the general character and description of the subterranean waters, and it is said there is abundant testimony to warrant the conclusion that at ordinary stages of the river the water flowing on the surface, and that which is beneath the surface, are in intimate contact, and moving in the same direction.

While this in a general way may be said to be true, it is submitted that if technical accuracy was here intended, it is not supported by any evidence in the case on either side.

We do not know that there is any difference between contact and intimate contact. But if the latter phrase is intended to give any additional force to the fact of the waters being in contact, the evidence does not support such intimacy of contact. All percolating water is in motion; it cannot percolate unless it is in motion any

more than it can flow in a defined channel. The particles of percolating water are in contact wherever they are found. So these waters are in contact from the original sources on the mountain tops to the point that they ultimately reach, whatever that may be, after sinking in the sands in the city of Los Angeles.

But was there ever a well affected by the diversion of percolating waters, unless the waters of that well were in contact with those percolating waters in exactly the same sense that the flowing stream here and the subterranean waters in this basin are in contact? Was ever a spring or water-course in any manner affected by the diversion or draining of percolating waters, unless they were in contact? It is respectfully submitted that if there is any novelty in this case, or if it be of first impression here, it is not because of the presence of either contact or intimate contact in this case, and the absence of it in others.

No question can by any possibility arise between the claimant of a well, spring, or natural water-course, and he who claims percolating waters, if they are not in contact. The question of the
1159 rights of parties to percolating waters is nothing novel here; it has arisen frequently, been decided apparently without difficulty, and always the same way. And yet we say again in all those cases, the very question assumes that the waters are in contact.

In Hanson *vs.* McCue, 42 Cal., 307, the allegation was: that the defendant was digging a ditch or a tunnel on his premises where the spring is found, in such a way that, if the digging be continued, it would inevitably cut off and intercept "the hidden and subterranean veins, streams and sources of said spring, and which supply the same with water, and will thereby divert and lead away the waters which would otherwise flow into said spring, and will so lessen, diminish or entirely cut off and stop the usual and ordinary supply and amount of water in said spring, that no water would flow therefrom, to or upon said premises of the plaintiff." The very statement of it supposes the contact of these waters.

In Crescent Mining Company *vs.* Silver King Mining Company, 54 Pac., 244, the court said, at page 245:

"The waters issuing from the artificial tunnel into the lake are found to be underground, percolating waters from the mining claim of the defendant, and not waters naturally flowing in a stream with a well-defined channel, banks and course. Under such a state of facts the law seems to be well settled that water percolating through the soil is not, and cannot be, distinguished from the soil itself. The owner of the soil is entitled to the waters percolating through it, and -nary rules of law applying to the appropriation of surface streams, do not apply to percolating water and subterranean streams with undefined and unknown courses and banks. When water percolates through and under the surface of the earth upon land belonging to one person, and comes to the surface just before it empties itself upon the land of another, the owner of such land has no right to demand that such percolation shall continue."

1160 But water cannot percolate through and under the surface of the earth upon land belonging to one person, and come to

the surface just before it comes upon the land of another, without being in contact.

In The Southern Pacific R. R. Co. *vs.* Dufour, 95 Cal., 617, it was distinctly found that these percolating waters fed this spring, and it had never been fed by any running stream of water. "The finding is amply supported by the evidence," said the court. They were held to belong to the owner of the soil, and that "no action would lie for injuries caused by cutting off subterranean channels percolating the soil or running through unknown channels and without a distinct or defined course."

Quoting from Trustees of Delhi *vs.* Youmans, 50 Barb., 316.

It is needless to pursue this proposition further. These authorities, as well as all others upon the subject, prove that the contact of the waters in the present case is a false quantity. It does not distinguish it from any other case under the sun where this right of ownership of percolating — was involved.

It is said in the fifth paragraph of the opinion, on page 15 of our copy, that:

"It is agreed that all the waters of the San Fernando valley, except what is lost by evaporation or consumed in plant life, flow out through the narrow pass between the eastern extremity of the Cahuenga range and the Verdugo hills, either on or beneath the surface," etc,

This is doubtless a correct statement in a certain sense. The engineers all appeared to be of that opinion; but they had this difficulty to encounter,—the Los Angeles river, at the northern boundary of the city, has a constant flow of about 4,000 inches. The testimony in this case tended to prove strongly that the amount of the underground flow, or the whole of the percolating waters from this mountain shed, over and above the flood run-off, and that
1161 consumed by plant life, and vegetation, to be from twelve thousand to nineteen thousand inches. No estimate of the waters flowing through the sands in the city of Los Angeles amounted to more than fifteen hundred inches. All of the water taken together that could be accounted for did not reach more than five or six thousand inches. Therefore, if there was any such an amount as was claimed by most of the witnesses it did not come through this narrow pass, and one of the instructions objected to by the defendants, the tenth, was based largely upon that fact.

The court correctly appreciates the topographical situation. These waters come down this San Fernando basin, and at the Pomeroy and Hooker tract the valley is about three miles wide, we will *use* say, or three and a half. Now, the inclination of the ground is not only easterly, but southerly; and these waters press against the Cahuenga hills, and it is that fact that causes a considerable portion of those waters in this tract to come to the surface, so that the increase is correctly stated to be about a hundred per cent. between the two extremities of the tract sought to be condemned.

Now, one of the claims suggested by us was, that there were certain phenomena in lands on the southern side of this Cahuenga range, that could not be accounted for from any local watershed

namely, the Cienega range and the Ballona creek. Hence we contended, and we still contend, that it is the sheerest guesswork to say that these waters all come through that pass; but on the contrary, the same pressure against this Cahuenga range that raises the water plane there, and causes a considerable quantity of water to flow into the surface stream, does also, or at least may, drive no inconsiderable portion of those same percolating waters through the Cahuenga range, which, emerging on the southwestern slope, produce the Cienegas, the creek of La Ballona and the Ballona swamp.

If these waters percolate from the sands of the bases of the San Fernando mountains, down through the valley to this
1162 narrow portion, and on through the Cahuenga mountains, producings cienegas and swamps along the Cienega ranch, and ultimately some portion of them coming to the surface and making the Ballona creek, would it still be true that they are part of the Los Angeles river, or that they are not percolating waters, and that Pomeroy and Hooker would have no right to divert them from their lands? If not, the tenth instruction is clearly erroneous. It is to the effect that if the jury believes that some portion of this subterranean water, no matter how much, is lost before reaching the point where it would have gone into and made a part of the surface or subterranean stream of the Los Angeles river, these defendants would not have the right to divert an amount of said subterranean water equal to or less, or, we may as well state it in one breath, any at all of this amount, this loss, if such diversion would have the effect of diminishing the waters, surface or subterranean, of said river above the south line of the pueblo lands of the city of Los Angeles.

Now, as we still insist that that instruction alone ought to lead to a reversal of this case and a new trial, pardon us if we take time and space to clearly illustrate our view.

Let it be noted that the instruction does not make any difference whatever as to the point where this loss may occur. The honorable chief justice saves this instruction from error in this way, that if it be a part of the Los Angeles river, no matter at what depth it may be flowing beneath the surface, lower riparian owners have the riparian right to have that water flow as it was accustomed to flow. In other words, if it be a water-course, as the court subsequently concludes that it is, the same law applies as if it were flowing on the surface, and hence the instruction was correct, because Pomeroy and Hooker could not have diverted any portion of this to be used upon non-riparian lands, being governed by the law of riparian ownership.

But note again, it does not make any difference where
1163 that loss occurs. This Pomeroy and Hooker tract sought to be condemned is two or three miles in length. These waters come together in a contracted space just about where they enter the Pomeroy and Hooker tract. In fact, our impression is, without looking at the map, it is about the narrowest place. The Tejunga creek comes in just to the east of the west boundary of this tract. Here the pressure against the Cahuenga range is doubtless the

greatest. If any portion of the waters do go through his range, they undoubtedly leave this general drift of the underflow before they leave Pomeroy and Hooker's lands.

If that is the case, and if any stretch of the imagination can still make of them a water-course and the Los Angeles river, still if they assume the form of percolating waters, and are lost to the subterranean Los Angeles river before they leave the Pomeroy and Hooker tract, then it would not be true that any riparian owner would have any right to complain, or would have anything to complain of if they were diverted.

There is, too, in this tenth instruction, and in the reasoning by which the court supports it, something which would appear to be diametrically opposed to Kinney's view of the law as subsequently quoted, or at least it would be opposed to that policy which is doubtless the inspiration of Kinney's remarks, and we rather think, though it is not so stated, is also in the mind of the court.

The conditions of this country have formed the foundations of much argument here. The character of the streams, the often-occurring phenomenon of rising and sinking, the flowing through stretches of sand and gravel and rising again to the surface, have given occasion for the efforts to distinguish the conditions here from the conditions elsewhere, so far forth as to mold a law different from that which governs other countries upon this subject. And we say again, of course with all deference, that we think that this supposed difference of conditions impels the prescription of a
1164 slightly different rule with respect to distinguishing between percolating waters and natural water-courses, and has given much of the coloring of this opinion throughout. But, we respectfully submit, that the application of the Kinney doctrine to such an extent as is contained in the tenth instruction, is absolutely ruinous of all the interests of this country.

These borings have shown that this soil is saturated to a depth of from sixty or seventy feet to much more than a hundred. It is scarce permissible for us to go outside of this present record and say what other borings in other localities have developed, but we may nevertheless say that what has been shown here, and especially in view of the fact that the testimony practically shows that the conditions geological that exist in this tract are not peculiar to the tract, but belong to the valley. Hence, these waters may continue on down their course at a depth of from fifty to a hundred feet below the surface of the ground. The fall is, as we recollect it, on an average of about thirty or forty feet to the mile. Now, if this instruction, sanctioned as it is by this court, is to crystallize into the law of this land, it follows that a riparian owner could prevent any developments of water in any portion, not only of this San Fernando basin, but any other basin, or valley in this section of the country, (of which there are many different from this one only in trifling particulars), although this subterranean flow may be flowing through his land at depths such that he can make no possible use of it on his land.

If one owned a section of land through which water such as these

in this valley were filtrating and that moving mass extended on both sides of this section to the distance of a mile, and was flowing fifty to a hundred feet below the surface, and, although as before stated, he could make no use of it himself, he can prevent an upper riparian proprietor from diverting any portion of it, because, forsooth, being under the definitions here a water-course, he is
1165 entitled to have it continue to filtrate as it was accustomed to filtrate through the lands of his upper riparian neighbor. He may bore a well and obtain water to drink, provided he has not the misfortune to have an ancient pueblo below him, but that is all he can do. Possibly he might pump, but pumping does not furnish a very promising method of irrigation. The result is, that the common-law doctrine in its most appalling form, will become the law of this State as to these underground waters, and the riparian owner of such a stream has a much more onerous proprietorship, if we may be allowed such an expression, than he would have had if the waters had been on the surface. Then he might have made a reasonable use, allowing to his neighbor a like reasonable use; but in such a case as this instruction would embody, the water must continue on underneath the soil, each riparian owner having an absolute right to insist upon it, but without the possibility of the use of it by any of them. This is not a State policy so precious as to warrant us in rushing to such a conclusion unnecessarily.

In the course of the opinion, at page 21, it is said that it might be a sufficient answer to the objection now urged in the argument against this instruction 10, to say that it is not one of the objections stated at the trial and specified in the exception then taken. But the point is waived, and the court proceeds to discuss it. Lest it might not be waived again, we would call attention to the fact that it is excepted to. (Transcript, folios 4120 and 4121.) We do not see why the exception there is not sufficient to cover any point that is urged here. Indeed, we are not aware that the statute requires that we should give the reasons or make an argument in support of the exception at all. But we think that a closer examination of the instruction will show that we have even minutely specified wherein it is error.

The mere fact, says this instruction, that some of the subterranean water forming part of the stream on the land sought to be con-
1166 demned may be lost before reaching the point where the same would have gone into and made a part of the surface or subterranean stream of the Los Angeles river, etc. Now, does not that instruction assume that some of this subterranean water may have been lost before it has reached either the surface or the subterranean stream of the Los Angeles river? In other words, that some portion of this water is in truth percolating water, has not yet become surface stream nor subterranean stream of the Los Angeles river, and being no part of either, it may be lost before it becomes either, and having been so lost before it becomes either, still Pomeroy and Hooker are not entitled to it? If to avoid this the last clause is added, it would stand thus:

If a part of the subterranean waters in the lands of Pomeroy and

Hooker, which have not yet become a part of either the surface or subterranean Los Angeles river, is lost before reaching the point where it would have gone into and made up part of the surface or subterranean stream of the Los Angeles river, this would not give the defendants the right to divert an amount of said subterranean waters in said land equal to or less than the amount so lost. But, may it please the court, if it is not at any given point in the Pomeroy and Hooker lands part of the subterranean or surface Los Angeles river, and if it would be lost from that section, as we may say, before it would reach the point at which it would become part of either, how in the name of common sense could it ever have become part of either whether it were or were not diverted?

There is no conceivable state of the law that can justify that instruction, except the monstrous claim of the city that it is the absolute owner of every particle of moisture that every finds its way into the San Fernando basin or the San Fernando valley. In that event, it of course makes no difference whether it is lost or not, or where it is lost.

If one dips up a bucket of water from a stream from which
1167 he has the right to dip it, and sets it on a bench under a blazing sun, it belongs to him, and another has not a right to touch it even though it sit there and evaporate to the last drop; but an ownership short of this will not justify this instruction. We do not understand the court to have intended to go to that extent in this opinion, but we do respectfully ask the court to scan this instruction well, and then say whether we are mistaken in its interpretation, and whether it could fairly be understood to be anything else than just what we say it is. Furthermore, this question does not in any manner depend upon how correctly or incorrectly the court below may have defined surface and subterranean water-courses, or how defectively or perfectly it may have distinguished between percolating water and streams.

At pages 15, 16 and 17, the court in its opinion makes a general statement of the controversy between us, and the general features of this stream, with which statement in its general outlines we have no fault to find. But before passing this statement, we call attention to a few lines that occur on page 16:

"A careful study of this testimony, though conflicting upon many important points, is in reference to the larger and more general aspects of the case, quite harmonious, convinces us that it is sufficient to sustain a finding in favor of the existence of a subterranean stream, if the law with respect to subterranean streams was correctly laid down in the charge of the court to the jury. There can be little doubt, we think, that the jury, under the instructions of the court found that the subsurface flow in those land was a part of the Los Angeles river, and governed by the law of riparian ownership, or by a pueblo right, still more favorable to the plaintiff. If this was the finding, and if it was made under correct instructions, it cannot be said that the award of compensation is unsustained by the evidence, for aside from the water flowing in the

subterranean portion of the stream as defined by the instruc-
1168 tions, there is no evidence to prove the existence of any considerable quantity of percolating water in the tract condemned, and the same evidence which shows an inconsiderable quantity of such water, tends strongly to prove that it could all be intercepted or drained by the owners of the adjoining lands before reaching the land taken."

With the further remark that the defendants have right to tunnel and take it away from their neighbors above, and thus deprive them of it, they could in turn do the same thing. Of this we shall speak to some extent a little further on; but the point here is, that it would seem to follow from what is here quoted, and much else in the opinion, that the distinction between proprietary rights in water-courses and in percolating waters, is not intended to be annihilated; that there is such a thing as percolating waters, and there is such a thing as water flowing as a water-course; that this water-course may be on the surface or beneath the surface; that in either event the law of the water-course is one thing, and the law of percolating water another, and that there is no material difference between us as to what the law is which governs either class.

Another point is when it is said that the court is convinced that there is evidence in this case to have sustained a finding of the jury that this was a subterranean water-course, it would seem almost necessarily to follow as an implication that upon that same evidence the jury might have found differently, and that the finding in either event would not have been disturbed by this court.

These propositions do necessarily involve this further consideration—that where the right of the proprietor of the land with respect to waters of a water-course flowing through them, is so very decidedly different from his right to waters merely percolating in the soil; and as this distinction is well grounded in the law and settled by innumerable decisions, there must be some means by which one can

determine whether the waters are of one character or th-
1169 other. And the important question in this case is, what are those distinctions? What are the tests by which we can determine whether water is percolating, or are the waters of a water-course? We say "water-course" advisedly, because we think that the authorities are, that in order for these underground waters to be governed by the law of surface streams, they must be water-courses.

On page 33 of the opinion, the learned chief justice says:

"The difference between counsel and the superior court at this point seems to be that to them all water passing through sand, gravel and boulders is percolating waters, and the mere fact that it is percolation is inconsistent with the idea of a stream, while to the court there is no such inconsistency when the material through which the water forces itself fills a well-defined channel with impervious sides and bed, through which a considerable body of water flows from its source to its resting place. If this view of the court is correct, the instruction is neither erroneous nor obscure."

The court is now speaking of instruction 12.

With deference to the learned chief justice, and we speak always

with the utmost respect, this does not correctly state the position of the counsel for the defendants; nor do we think it states the position of the learned judge of the court below with exact correctness.

There are streams in the State of California, there are some in southern California, that issue out from the mountains in perfectly well-defined channels, as we understand them, in a surface water-course according to all definitions of that term, and filling every requirement of a natural water-course, which streams do sometimes sink out of sight entirely for a short distance between mountain sides or lower hills or plateaus, and rise again, or, at least, waters appear in the same course at no great distance from where they have disappeared.

1170 Perhaps a still more common phenomena is the subsidence of the waters, or a diminution by the more rapid absorption through the coarser material in the soil, and then a refilling at other places where the conditions are different.

It is not the opinion, nor the position of the counsel for the defendants, that such phenomena destroy the character of the stream as a water-course.

In all subjects of legal inquiry, we find things which have a pronounced legal character unmistakably; but the conditions which constitute it vary in many different cases, and the precise point at which one technical name ceases and another begins may become difficult to determine. There are cases that have expressly held that under such a state of the case as we have here first supposed, namely, the water disappearing and finding its way through sands and gravels for a time and then rising again, that it does not lose its character as a water-course between these points of disappearance and reappearance. To this we make no objection. We cannot conceive that where there can be no question of the continuation of the same waters through substantially the same water-course, rising and falling at different places, it would require a different principle to govern different sections of this channel.

Now, we say again, at just what point this disappearance, and what extent and what conditions would end the character of a water-course and introduce that of percolating waters, might be a question of much difficulty in some cases.

Our position is, that the present case does not present any such difficulties. The introduction into these instructions of a hypothetical case of surface streams sinking and reappearing, is misleading, and adds nothing whatever to justify even a reference to such a phenomenon in these instructions. The Los Angeles river does not sink from the time it first appears on the surface; it does nothing, or substantially nothing, but increases from a few inches, 15,

1171 20, 30, 40, to 4,000. That when it comes into the city of Los Angeles it does begin to lose itself in the sands of its bed in the city, where the character of the bed is different from what it is at any point above, and in ordinary seasons the water rarely flows on the surface to the southern boundary of the city in the summer time. But that is not the case above the north boundary of the city. There is a constant, or an almost constant increase. The 2,000

inches at the Pomeroy and Hooker point of departure, is increased to nearly four thousand at the north boundary of the city.

There is evidence here to justify the finding of at least nineteen thousand inches as the sum total of the contents of these gravel beds of the San Fernando basin over and above plant life, evaporation and flood run-off.

The Los Angeles surface stream accounts for, we will say, in round numbers, five thousand. The evidence by which this nineteen thousand inches is supported, comes from men competent to speak, and figured upon a basis that is rational and probable, and without saying anything about which was entitled to credit, the highest or the lowest amount, in such a state of the evidence we had the right to have the jury properly instructed.

The supposed creeks around this basin of the San Fernando, are few in number and inconsiderable in quantity in comparison with the whole amount. The Big Tejunga, by far the largest, supplies ordinarily where it is flowing on the surface in the summer time, about four hundred inches.

The Pacoima an inconsiderable quantity; in fact, in the summer time it rarely flows at all. The sum total of all the streams around this entire basin will, in the seasons of irrigation, when the ordinary flow of the Los Angeles river is about four thousand inches, which we are assuming to be its normal flow, we say that all these streams which either do or are supposed to contribute to this, will be
1172 largely estimated at one thousand inches. Then all of the water that disappears from these surface streams are accounted for, and more than accounted for in the normal flow of the Los Angeles river; and indeed, accounted for four times over.

The remaining three thousand inches of the Los Angeles river comes from this underflow, we will suppose, (we do not profess to believe it, but such is the weight of the testimony here). Now, if there is in addition to this somewhere from two or three thousand to fourteen thousand inches, it never enters the Los Angeles surface river anywhere. It cannot be accounted for at the Los Angeles river at the north boundary of this city, either surface or subterranean.

Mr. Eaton, the star witness for the plaintiff in this case, figures out the underflow at the north boundary, or a little below the north boundary of Los Angeles city, at about five hundred inches; he thinks that is too small, although that is what a mathematical computation upon certain hypotheses would make it.

But he does not get above a thousand or twelve hundred inches of a possible underflow at that point. Add them together, call them, for convenience, if you please, fifty-five hundred; we shall still have two or three thousand inches at the least (omitting the testimony of Purcell), and about thirteen thousand five hundred at the most, which is unaccounted for at the north boundary of the city of Los Angeles, either surface or subterranean.

Now, if it existed at any place in the Pomeroy and Hooker tract, the only conclusion that can be drawn is, that it was lost. How? By disappearing in some other directions.

The tenth instruction, in that case, is most unquestionably erroneous; but say that the amount might never have existed, still we say that the evidence was there from which the jury might have concluded that it did exist, and that we cannot say it is obvious that the jury found this, that, or the other thing; they were
1173 instructed in such a way that it was wholly unnecessary for them to find anything in regard to it.

But now to return directly to the opinion. Under such conditions, we contend that the water which never did come into this surface flow, or underground flow, either is percolating water, or another name must be given to it, and a name which legal nomenclature has not yet invented.

The difficulties in this matter, too, are unquestionably felt by the learned judge of the court below. No definition of a water-course which he has suggested; none which the learned chief justice formulates, or indicates in the opinion of the court, will meet all of the requirements here without proving entirely too much.

A defined channel is given such a character as makes the view of the court below that the Verdugo mountains on the north, and the Cahuenga on the south, serve very well for those banks which in every definition of a water-course seem so essential a part of it. But there is apparently a timidity, at least on the part of the learned judge below, to follow this view to its logical conclusion.

The Mississippi river might be said to have for its banks the Alleghanies and the Cumberland mountains on the one side, and the Rocky mountains on the other. This would seem too great a stretch. But the San Fernando basin demands a water-course twelve or fifteen miles in width in some places, for that is the distance between these mountains. This makes it exceedingly difficult to draw the line of distinction between those waters which, pouring down the mountain sides in times of rain, or percolating through the soil of those mountains and reaching the gravel below, never having been in a defined stream, never having been anything else but surface or percolating water in the legal sense.

Now one element of the defined channel, as accepted here
1174 by the court, namely a knowledge of the direction of the flow, exists there just exactly as it does in this narrowest place.

The topography of this country is known; it is marked in innumerable places in the maps which have been filed herein. The principle by which the flow of water is governed, we know. It will follow the directions of the inclination along the lines of least resistance; and where, as here, the materials are substantially the same, we can stand on the surface at almost any place, and especially with these topographical maps in our hands, and know how that water must flow, so far as its general direction is concerned. But you may cut a thousand sections down through the earth in the Pomeroy and Hooker tract, or anywhere else in the San Fernando basin, and you may get down into them with a microscope, or with any apparatus known to man, and you cannot tell the direction of the flow of a single one of these filaments, or threads, of water permeating the

earth. Not in this tract any more than you can anywhere else in the San Fernando basin.

It is the unanimous testimony that every phenomenon which is presented by the borings of these places, is presented everywhere you go. There may be a question of more or less, but not in the character. But to say that this San Fernando basin was a water-course, is too much; and hence we have in the court's instruction the provision to meet this overwhelming difficulty.

Instruction 21: "A stream which flows along and in a natural channel, in some places flowing to the surface and in some places sinking in porous material which has been deposited in and has filled the channel, and there passing down along in the same channel under ground and again rising to the surface and flowing as a surface stream, is no less a stream or water-course at the point where it flows under the surface than at the places where it runs on the surface." (Opinion pp. 28, 29.)

Now, we have already shown that these streams flowing on
1175 the surface and rising again, do not exist except to a very limited extent, and hence as to by far the greater portion of these underground waters, this instruction has no foundation in the facts. But this is not enough. The instruction goes on: "And if part of the water remains moving under ground at the places where the surface stream flows, all of the water, both above and below the surface, constitutes the stream."

And now we come to this: "And if at places the channel widens very much and is filled with gravel, sand or other porous material in which the water spreads so as to fill the voids of the porous material forming the semblance of an underground lake or reservoir with no water appearing on the surface therein, but with the water passing on beneath the ground down the widened channel and afterwards reappearing below as a surface stream, then the water would be as much a part of the stream," etc.

It is obvious that this instruction was based upon the decision of the court wherein this flow from the lake through the materials of the soil into a well-defined stream, was supposed to constitute a part of the stream. Hence, this underground lake becomes a necessity to meet those conditions where there are absolutely no surface streams in this San Fernando basin, and hence this whole basin above this narrower valley, is turned into an underground lake.

It is submitted that here is a bran-new definition of a lake. What purpose it can serve in the law of this case, we do not understand. As a religious factor it may have some value. It may pave the way by which minds not overflowing with faith, may accept some stories that to the skeptical mind were somewhat incredible. If the Savior, when walking on the sea of Gal/ilee, which we have been led to suppose he was striding in an ecstacy of sublime faith, was in truth only treading that portion of it that was about one-fourth water, while it may be a great aid to credulity, still its value as a miracle is somewhat depreciated. It is a feat which any
1176 of us may perform on a lake whereon locomotives with long freight trains loaded to the guards, travel with impunity.

But these terms "underground lakes," or "underground reservoirs," (mark the terms), surely cannot so beguile us as to blind us as to what is really meant, through the mere glare of euphony and verbiage.

This underground lake, this underground reservoir, is what everybody else ever meant when they talked of percolating waters. It has its mountain chains to serve as its banks in order to make it a water-course, but they were too far apart for a water-course. It is respectfully submitted that this is the first time in the history of judicial definition of these things that we have ever found the distance between two mountain ranges furnishing a test to determine whether water is percolating or not. These ranges of mountains are not the banks of a stream, we submit, with the utmost deference. Furthermore an inference of the direction of the flow of water, deduced from the knowledge of the laws of gravity, and the topographical features of the country, is not that well-known course and direction that distinguishes the water-course from percolating water, if such a distinction exists at all.

If either of these things, that is, the space between two mountains, or relative altitudes coupled with the laws which govern the motion of waters, furnish us with the guide to the determination of such questions, why should we perplex ourselves with long dissertations upon any distinctions between the two at all? Can there be such a thing as percolating water under these definitions? Water cannot percolate unless it moves. It will not diffuse itself in every direction, as in one of the instructions the phrase is (taken, to be sure, from Wheatley *vs.* Ball, but misapplied), but underground water, if it moves at all, will take the direction of the inclination of the land in which it is found, and it will keep moving in the same direction; if there is a flowing stream anywhere in its vicinity,
1177 it will almost invariably guide us to the direction of the underground flow of percolating waters.

If this is what is meant by definite channels and known direction, it ends the possibility of the existence of percolating waters. We say that is not the test; that an underground water-course is exactly the same as a surface water-course: that if there is a defined channel with its beds and banks, flowing underneath the surface, the occasional interruption by the interposition of obstacles of sand and gravel which it permeates, again emerging into a defined channel, it would present one of those cases where its general features would direct us most naturally to conclude in favor of a water-course rather than that of percolating waters. But this same thing would be true of a surface stream. There is no difference between the two, as we understand it. And these instructions, sanctioned by the opinion of the court here, mean, we say again, that the general direction does not refer to the innumerable threads or filaments of water which go to make up this mass; for nobody will pretend in this case, that the course of any one of them can be traced for four inches, either by standing on the top of the ground or by any process that one chooses to adopt. You cannot get into these cuts, examine them in any way you please, and determine for the distance

of six inches, or four inches, what is the course of any one of the innumerable exudations that are taking place.

The turn which this case has given to this general term is, that it is not the general direction of the movement of any one little channel, or thread, but it is the determinability of the direction of the mass; and we say again, that it is always known in every case. There cannot be percolating water without it.

Let us now suppose another case, which Painter *vs.* The Pasadena Land and Water Company suggests, 91 Cal., 74, especially pages 78 and 82. That was a controversy over a reservation in a deed to the right to develop waters. The lands were marshy. The case
1178 supposed will be this: There is this marsh, or cienega land, where the fact that the soil is saturated is not only observable below the surface, but the surface is saturated with this moisture. We stand and look and discover that on each side of this, for the distance of half a mile, a quarter of a mile, or greater, or less distance, as the case may be, there are mountain ranges uplifting themselves. We know the relative altitude of the place where we stand, and that in some direction down between these mountains or hills, and we know that the inclination of the surface of the land is off in some direction between those hills which may be one mile or four miles apart, or twenty if you please; we look back in another direction and we see banked behind us some such range as this San Fernando range, and we know that this water is moving gradually, and we know that it is not climbing that hill, or mountain range behind us. We know that it is not going to take across the plain for any of these other ranges between which it is situated and climb over them; if it goes at all, we know how it has to go; and we say that this saturation, now, keep in mind, is as apparent upon the surface as it is underneath, and this extends for a considerable distance, we will say a mile, of the same kind of land, perhaps a quarter or half a mile in width. Query: Would this be the Los Angeles or Arroyo Seco stream, a natural water-course on the surface? It has never been so defined. But if it is not, suppose you spread over the top of this hypothetical area, a covering of say, two, five or seven feet in thickness, but which is dry soil, and underneath the conditions remain the same, is it an underground water course? and if so, why wasn't it a surface stream before the top was put on it?

From this point of view, is it true that the view of the superior court was not only reasonable and just, but was not opposed to anything that has ever been decided in this court? And is this view necessary to prevent the desecration of rights long sup-
1179 posed to be certain and assured. If it were possible that it could any longer be said that anything is settled by judicial decisions, it certainly has been settled that the owner of land owns the percolating water; that he owns them so absolutely that the fact that their abstraction would affect somebody's well, or spring, or water-course, makes no difference. Does not this opinion absolutely annihilate rights of this character long supposed to be certain and assured? Rights many of which have been acquired upon the

faith of these incidents of ownership of land were put beyond the reach of controversy? rights acquired upon the assumption that there was some principle by which the character of the water can be determined, and that those principles were also settled and established? We are told that it is not alone the defendants who own water-bearing lands in the San Fernando valley that can do these things, but that if they can abstract and convey to distant points the water to be condemned, others can do the same thing. If this is a consummation to be avoided, what becomes of the decision in favor of the city? We have had it determined in one case that the acquisition of other lands, by a proprietor, contiguous to his former riparian lands, will not extend his riparian rights. It would seem clear that the acquisition of other than pueblo lands, simply because they are contiguous to the pueblo lands, could not extend the pueblo rights. But under the opinions in this case, taken all together, Los Angeles city may incorporate Los Angeles county, and yet the right to take these waters and carry them away to any portion of the county, would thereby become a right of the city.

The antithesis suggested here is, that no one will be permitted to do this thing, yet the conclusion of the court is that the city can do exactly this thing, and furthermore, the possibilities are suggested on page 37 of the opinion, of driving tunnels through the
1180 Cahuenga range, and by extending filtration galleries in sufficient numbers, the whole flow of the river could be abstracted by others.

To be sure, there is a question in this case of whether if the water be percolating water, that could or could not be done. But then this case was put before the jury, with evidence which tended to show that by a system such as the city proposed to construct, or substantially that, three thousand inches of water could be developed which would not interfere with the flow of the Los Angeles river.

Now, to take the hypothesis (to say nothing of its impossibility—we mean from a financial standpoint), involves a result, which it was attempted to exclude from this case, and is not putting a parallel proposition at all. Besides the 23rd proposition, quoted on page 30 of the opinion, shows the difficulty under which the mind of the learned judge below was laboring in this matter. There the judge is supposing the case that these waters are percolating: that they belong to the owners of the soil. Now, if the jury believed that some such waters came on to such lands from the lands of others above, and pass on to lands below, and that such upper proprietors could by the construction of tunnels or other works, cut off or divert said waters, or some part of them, and such lower proprietors could construct tunnels or other works on the lands lying below the lands sought to be condemned, which would have the effect of draining or depriving the land sought to be condemned of their subterranean waters, etc., then the jury are instructed that these upper and lower proprietors would have the right to do the same thing, and that this fact should be considered by them in determining the value of the percolating waters to the defendants or their lands.

This is one of the instructions objected to, and one which is upheld by this court, and yet it will be observed that there is a sort of darkey's coon-trap, which takes him either "comin' or gwine," and all manifestly because it is not known exactly which way the
1181 thing would work. But the very objection to such an instruction at all, is that it was submitted to this jury with the privilege of making a blind guess, without a particle of evidence under the sun upon which to base a conclusion as to whether these defendants might not be deprived of all value here by such action. We say that if such things can be considered by the juries in condemnation cases, and especially in this, it would involve the trial of questions of a scientific character, and without end, and probably never to be accurately determined.

Bear in mind the conditions—the average fall about thirty or forty feet to the mile; total distance, say twenty-five miles; depth of saturated plane from sixty to one hundred feet. Now, punching holes in the Cahuenga range is not a work that would likely be under taken by anybody for fun, nor is it likely to be undertaken within our day and generation for money.

One of the chief values of the Pomeroy and Hooker site is its elevation above the city of Los Angeles, cutting down about thirty-two feet at the upper end of this drain tunnel below the surface, would take us there probably twenty feet below the plane of saturation, maybe twenty-five. Now, if any one below the lower end of the Pomeroy and Hooker tract should cut in, perforating the water plane forty feet below its surface, there would be two difficulties to encounter to make this threatened injury to the defendants of any value whatever. First, it would be too low down to render this site eligible at all. It certainly could not come in competition with the Pomeroy and Hooker tract; the city proposed tunnel begins at nothing, and ends at thirty feet. The upper end is eight thousand feet and over from where it starts. Is it credible that cutting another tunnel ten thousand, twelve thousand, fifteen thousand, or some greater number of feet further down the river would have the slightest effect towards drawing off this water from above? It would not; it could not. The intervening mass is too great for the
1182 movement of the waters to be even accelerated by such an excavation, much less exhausted.

Now, go above. The further up you go the deeper your excavation must be, for it is shown that the superincumbent unsaturated mass increases in thickness as you go up into this basin. Financially the scheme is impossible. You could not make a cut; you would have to run a tunnel, and that tunnel would have to be run for miles in order to intercept any considerable portion of this underground flow. Even then if you cut deep enough to intercept a sufficient amount to even affect the flow, you will have run against a financial barrier that would be impassable.

No such condition of things will ever take place, nor was there any evidence in this case that would have justified the jury in considering it for a moment, and the court below ought not to have submitted such a proposition to them. Besides that, it was shown that

the Pomeroy and Hooker tract extended so far northward across this valley that in order to get around the tract at all, either northward or southward, they would have to go so far up into the plain that the financial and engineering difficulties would have been insuperable. Now why should the jury be permitted to speculate upon such a proposition?

Much stress is put in these definitions, and in the dissertations thereon, both in the instructions of the court below and the opinion of the learned chief justice, upon the knowledge of these channels, or of this flow, as an element in shifting it from percolating waters to a water-course. Quoting from Kinney, (page 35 of the opinion), the court says:

"But for this purpose the underground water must flow in known and well-defined channels, so as to constitute regular and constant streams," etc., * * * * and again:

"Although there are undoubtedly a great many underground streams whose waters flow in confined channels but whose
1183 courses are not known, and following the above rule, these are all classified with percolating waters."

Then, continues the chief justice:

"The point to be especially quoted here is the meaning ascribed to the words 'defined' and 'known.' 'Defined' means a contracted and bounded channel, though the course of the stream may be undefined by human knowledge, and the word 'known' refers to knowledge of the course of the stream by reasonable inference."

It is submitted that here is a misconception of the meaning of these terms and their significance in the various opinions in which they occur, and that the use of the word "known" in respect to these things serves to marke the conclusion of an entirely different question from that which is here considered.

The overwhelming weight of authority is, that where an underground stream has a well-defined channel, or is a defined water-course, the knowledge of its course is wholly immaterial. It does not become percolating water because nobody knows its course, nor because none know of its existence even. We say this word "known," here, has reference to a different point of dispute. It has been made a question by some of the most learned judges in the United States whether an underground water-course whose existence is not known is governed by the law of a surface water-course, it being thought a great hardship that one should be punished for some act by which such a water-course which is flowing through his land has been affected, when he neither knew, nor by any reasonable investigation could have known, that any such thing existed. We say again that we think the weight of authority is that his knowledge does not affect the question. But it certainly does not mean that the water is percolating or not accordingly as he does or does not know its course.

It has nothing to do with the general definition of what
1184 constitutes a water-course, and generally in the books that term "knowledge," does not occur at all in the definitions.

"The waters issuing from an artificial tunnel into the lake, are

found to be underground percolating waters from the mining claim of the defendant, and not waters naturally flowing in a stream with a well-defined channel, banks and course," is said in the case in the 54th Pac. Rep., and knowledge is not there necessitated.

But the case where this truth is brought most prominently and most unmistakeably forth, is that of:

Haldeman *vs.* Bruckhardt, 45 Pa. St., 514; S. C., 84 Am. Dec., 511.

Here the Pennsylvania court, speaking by Mr. Justice Strong, seems to make a distinction between an underground water-course, whose existence and direction are known, and one which is not known. But we say again, the distinction is not between what does and does not constitute such an underground water-course, but what difference the knowledge or ignorance of the owner of the land makes in the question of his rights. See also:

Lybe's Appeal, 106 Pa. St., 634, New Albany and Salem R. R. Co. *vs.* Peterson, 14 Ind., 112;

S. C., 77 Am. Dec., 60, and the note thereto on page 62.

It is this:

"It is impossible to establish correlative rights in subterranean streams, the situation of which is not known. They fall within that principle of law which gives the owner of the land whatever is beneath the surface."

Citing:

City of Greencastle *vs.* Hazelett, 28 Ind., 189; Taylor *vs.* Fickas, 64 *id.*, 172.

In the note to Wheatly *vs.* Baugh, 64 Am. Dec., 727, it is said:

"Water percolating the soil beneath the surface, without a definite channel, or in courses which are unknown and unascertainable, is not subject to the settled law governing the rights of riparian owners."

1185 Citing the cases.

Now note that there, it is not defined as being without a definite channel, and in courses unknown and unascertainable; but it is either one or the other,—without a definite channel, or without courses which are unknown and unascertainable, and the allusion here is as to the difference of opinion, or rather to the opinion, that even though it be a true water-course, yet unknown and its course unknown, the rule is different from that of known water-courses.

We say again, that our own impression is, that the authorities, taken all together, seem rather to support the proposition that knowledge and ignorance are not the tests of the rights of parties to a real underground water-course, but that it has been held in some cases that knowledge of it does affect the question.

Before leaving this question, we beg leave to remind the court that one of the questions which arises in this case, and one that has given us some difficulty, grew out of the fact that the statute making the value at the time the summons is issued the measure of compensation, confronted us in this case with this difficulty,—that it

*what* certainly true that when the summons was issued in this case, neither party had full knowledge of the value of this subterranean water, its amount, or anything else concerning it. At that time there was some knowledge of its existence; the city had already had the privilege of boring holes in the lands of these parties, or had taken it, and they knew enough of it to be prepared to expend $120,000 in making these excavations. They did it with no expectation that they were going to interfere with the surface water, so we contend. The city, therefore, did know that this land possessed considerable value. But we say again, the subsequent explorations undoubtedly increased the city's knowledge of this matter. It is unquestionably true that at the time the summons was issued the defendants had not, perhaps, as much knowledge as the city had. No
1186 great while before that neither one of them had any knowledge of it. It would be somewhat strange to say that water is flowing in a known course, known direction, when its very existence at all was not known. Now it appears that the meagerness of our knowledge upon this subject at the time the summons was issued, is held to properly constitute an element to be considered in determining the value of this land at the time the summons was issued. But while our ignorance of its very existence is held up before the jury as a reason why its value should not be considered by them, and the value is brought down to practically nothing, having served that purpose, we are immediately afterward brained by the proposition that this is not percolating water, because it is flowing in a well defined and known course. We say again, people cannot know the course of a stream, whether it be percolating waters, or true water-courses, the very existence of which is unknown; but now, says the court, we do know. But how? Why after the expenditure of thousands of dollars, the boring of wells all over this section of country, including the land here sought to be condemned, we have ascertained its existence, its quantity approximately, the general direction of the mass; nine-tenths of which knowledge has been acquired since the commencement of the suit, and in the very investigations that were made in the preparation for it.

These waters are percolating or not percolating. They have been percolating since the issuance of the summons, or they never were. If they were percolating before the action was brought, they have never quit percolating; and yet we say again, the knowledge of these things has been acquired by most careful experiments conducted at great expense and by divers eminent engineers. If, therefore, this knowledge is to become an element in the definition, then we say that this particular water does not fill the requirement, or if it does, let us talk no more of percolating waters. A series of careful experiments will develop the gen-
1187 eral course and direction of any waters that ever were held to be percolating. Less than very careful experiments will show us the confines beyond which it cannot pass, either to the right hand or to the left. If a knowledge thus acquired, if conditions thus ascertained are sufficient, there are no percolating waters. If the knowledge here spoken of is unattainable by any means, the

waters themselves do not amount to a row of pins to anybody; they are not worth speaking of.

We say again that in any of the cases heretofore decided a knowledge of the course of the stream is a fact to be considered in determining the rights of the parties, it has reference to these decisions wherein it has there been directly held, or at least strongly intimated, that if there be an actual, true underground water-course flowing through the lands, of the existence or course of which the owner knows nothing, it is not governed by the ordinary laws of riparian ownership; and that if by some lawful action taken on his own land that underground flow is affected, it is not a wrong done by the owner of the land. It is not a fact upon which the question of whether the water is percolating or not is to be determined, but on the contrary, in all such cases, the existence of a true underground water-course is assumed.

In Hanson *vs.* McCue, if those waters are flowing to the spring and causing the flow there found, their course was known. There may not have been any such an amount of evidence introduced in that case as in this, but cases do not differ so far as the legal principles are concerned, with the relative amounts of evidence introduced into them. Hanson *vs.* McCue did not proceed upon the theory that the direction of these waters is such an occult and hidden fact as that they did not know whether they affected this spring or not, but it proceeded upon the very ground that they did affect it, but that it made no difference in the rights of the owners of the land.

1188 One of the arguments which appear to have affected the mind of the court, is stated in these words:

"Once conceded that the defendants may draw off the subsurface flow or any part of it, the same privilege must be conceded to others, and the man or the corporation that can put in the largest tunnel at the lowest level, will get the lion's share, while the inhabitants of Los Angeles will get none. The doctrine, therefore, while ruinous to those who have built up a populous and prosperous city upon the faith that they were secure of a supply of water for domestic and municipal purposes, would afford no security to the defendants or to any one in their situation, for what they could take from the city, others could take from them."

Opinion, page 37.

We confess that this — a startling statement, but in the evidence in this case at what point is to be discovered the foundation for it? The man who taps these waters at the lowest level would get nothing, simply because he could get nowhere with it. The person who undertook to run a cross-section across this so-called river bed, a distance of two and a half or three miles, and maintain a cut or a tunnel a hundred feet deep, would be required to build a wall so solid that no water would come into the excavation. He who cut at the bottom of this sixty or hundred foot saturated plane, the ordinary height of a tunnel, and of such a character as could be maintained at any reasonable expense, would take away comparatively a small portion of this water.

Permit us to pause here for a moment to illustrate as clearly as we can. This soil, while it is permeable to water, does not easily admit of the passage of the water through it. If we take as much as a mile, we will say (and a much shorter distance in our opinion would do), we would have a dam, accepting the phraseology of the court below in its construction, a mile in thickness and of a
1189 width of two and a half or three miles. It is to be believed that one who should go below the Pomeroy and Hooker tract and cut into the same saturated plane, would accelerate the flow of the waters above for a distance of a mile, we may add for the distance of 750 feet? This main tunnel, which does not really begin to tap the saturated plane to any appreciable extent until it gets four or five hundred feet above, would tap it about twenty-five feet below its surface at the upper end of the main tunnel. The filtration galleries branching off in different directions,—is it conceivable that this section excavated below, whether at a lower level or on the same level, would affect the flow in this tunnel of the proposed headworks? It is inconceivable. But, if it were possible, it is only at an expense that rendered it simply impracticable, and there is no evidence in this case to justify any apprehension of the danger suggested in this paragraph of the opinion. Or even if there were any such danger reasonably to be apprehended nevertheless that would not affect the right of Pomeroy and Hooker or of other land-owners to do as they will with their own.

Again, we know the Crystal Springs developments have existed there ever since the year 1890, and have carried from 500 to 600 inches of water, subterranean, and this does not affect the flow of the river at the north boundary; we mean, of course, the surface flow that which we call the river. The works here proposed do not penetrate to the bottom of this saturated plane, and according to the testimony of a large number of competent witnesses, three thousand inches could be taken out without in any manner affecting the surface flow of the river.

We had the right to the judgment of the jury upon that question. Yet when the court says it is enough that we affect this subterranean flow, and, in the tenth instruction, that we need not even do that, in order to make the conduct of these defendants illegal; or in other words, that we cannot take the water at all, whether
1190 it affects either the surface or subterranean flow, or neither, under this tenth instruction.

We claim that it was error, and that it cannot be avoided by appealing to the just expectations of those who built up the city, for those who built up the city never had any such expectations. These underground waters were not known to exist until very recent times, not long before the commencement of this proceeding.

The city was founded in 1781. It never had a drop of percolating waters from this valley until the year 1890, when it was developed by the Crystal Springs Company on another tract of land far below this; which development affected neither the flow above nor below this development. The water still flows on into the city of Los Angeles, and brings to this lower cross-section, inside of the city

limits, 2,830 inches. (See testimony of witness Eaton, folio 1431, 1434.)

There are 750 inches ordinarily taken in the main supply ditch (*id.* 1432).

Now, ordinarily, the amount of water used in the city is about twelve hundred inches; in the summer time perhaps it goes to fifteen hundred. This is all taken from the surface flow except this five or six hundred inches in the Crystal Springs pipe, the title to which is in controversy in another suit. There has not been a time in ten years that water has not been flowing down into the city of Los Angeles, and sinking in its sands below every diversion that is made for the uses of the city, or anybody else, and that too, to the extent, as we said before, of about 2,830 inches.

This main supply ditch we say takes 750 inches on the Pomeroy and Hooker tract. It is scarcely missed. There are two thousand inches, and more that leaves the eastern boundary of that tract. If this city should increase to two hundred thousand inhabitants even by the process of incorporation of other sections of the country, there is still an abundant supply of water for the inhabitants of the city.

1191 We do not deny that this underground water is desirable. Its purity is doubtless greater, and is of such consequence to the city as would warrant the condemnation of a way through it to develop these waters and utilize them; but they are not necessary for the use of the inhabitants, nor do they constitute the waters upon the faith of which the city was built; and the men who built it knew nothing of this water, and the surface flow of the river is that which has constituted the supply of this city for more than a hundred years before there was a drop of anything else in the city. It was before this court in the Vernon irrigation case, it is before this court here, that there has scarcely been a time that the city has not been furnishing people outside of the city limits with water from this Los Angeles river, and still water was going to waste. And there is, we submit, no evidence in this case that proves, or tends to prove, that the city would be deprived of a particle of water by this development. And if it were, and if that made any difference, what would be the difficulty in asserting its rights when the fact appeared? There is no place else that this water can be taken that it would not (if it belongs to the city) be available to the city as well. The very choice of this location is in the fact that it enables the city to be supplied at about the highest level of any place in the valley where the construction of such works is feasible.

But returning, now, to other instructions, the court seems to think the twelfth instruction clear enough to involve the question of its correctness. But in that instruction the court says that in addition to these rights and benefits, the defendants are the absolute owners of all the waters present in this soil that is called a part of the water of the river. "This is usually called percolating waters," says the court, but after adding, "there is no magic in that term," the court then proceeds to lay down the rights of the owner of

the soil to these percolating waters, in a way that is, we think
1192 correct; but in view of the other instructions given, the court made its definition of a river so broad, that it is impossible that any water could be in these lands, or in that valley that is not a part of the river. As we have said repeatedly, and as the learned chief justice in his opinion says, wherever these borings have been made throughout this valley, (and wells have been bored in almost every part of it,) we are confronted with exactly the same conditions. No investigation of any kind has yet discovered anything different in one portion of the valley from that which obtains in another. There may be a difference of greater or less, but the fact that it is percolating, its general direction, and everything else concerning it, is everywhere substantially the same.

Now, passing the 13th, 14th and 15th instruction, we come to the 16th and 17th. They are too long for quotation in a petition which is already too long, but we maintain that when the court instructs the jury that it is for them to determine now, as a question of fact, what waters in this land, if any, are the waters of the stream, and what not, the learned judge who was giving the instructions did, of course, assume that the jury might come to either one conclusion or another upon that subject. And so, too, in the opinion delivered by the chief justice, we are told that there was evidence to justify a finding of the jury that this water was the Los Angeles river; which, we say again, assumes that upon the same evidence also, the jury might have found differently. Now, if we are not mistaken about that, upon what principle can the 16th and 17th instructions be supported? It is true that the court said, if you find thus and so you should find that it is a river or water-course, thereby implying that if the jury did not find that way, they might come to a different conclusion. But in the main substance of these two instructions, the facts stated were such as that there was no conflict in the evidence covering them at all. The court just as plainly
1193 told the jury how to find upon that subject as if the court had said to the jury that this water is a part of the Los Angeles river, and does not belong to the owners of the soil, and Pomeroy and Hooker have no interest in it.

We quote a line or two from the 16th instruction: "If you find from the evidence that there is a bed or river bottom filled to a considerable depth with sand, gravel, or other coarse material," etc. Now the court there intends to tell the jury that there is no distinction between the bed of a river and the river bottom. We do not controvert the proposition that the owner of land cannot perforate the bed of a river and take the water therefrom, and thereby drain the stream; we have already taken occassion to say repeatedly, that a water-course consists of a bed and banks and the water, and we have never understood the bed of a river to mean the immediate surface of the ground beneath the water; nor did the engineers who were testifying on behalf of the defendants, propose to perforate the bed of the river with any such works as were here supposed, unless with pipes so closed and constructed as that the water from the bed of the river should not be permitted to flow into them at all. But

the court here, after speaking of the bed of the river, puts it not in contradistinction from the river bottom, but apparently as meaning the same thing, and the jury could not have understood the learned judge to mean anything else; nor do we think that he intended they should have any other understanding than that he was not confining his instruction to the bed of the Los Angeles river as it flows on the surface, even extended down to the center of the earth; but if the river bottom was filled to a considerable depth with sand, gravel, etc., still the result is exactly the same.

Now, if instructions 16 and 17 are read carefully, it is impossible to discover why those instructions would not cover any percolating water whatever. It is true the percolating water is not necessarily always found in a river botton; it generally is, however, but
1194 it certainly cannot be that the locality can determine whether water is percolating or not, for if the same phenomena here described, were found elsewhere, omitting only the river bottom, it could not affect the definition of percolating water, nor give any narrower scope to the meaning of a water-course. So that we insist upon it that those two instructions, together with many others of a like character, did not leave to the jury to determine whether the water was percolating or not, or if it did it ought not to have done so, for we say again that there was no conflict in the evidence of any substantial character upon any of these questions; the topographical features of the country, the flow of the Los Angeles river on the surface, the character of the soil as developed by the borings, the manner in which the water proceeds in its downward course according to the laws of gravity, were facts that were agreed upon; and if from such a description as given in those two instructions the jury might find that the water was a part of the river, then it was their duty to find it. It does not seem possible to us that if the jury had found, and we knew they had found, that that water was percolating water, the court, if it adhered to the views expressed in those two instructions could refuse to set the verdict aside. If these instructions are correct, it is quite true, as said by the chief justice, at page 17 of the opinion, "If this was the finding, and if it was made under correct instructions, it cannot be said that the award of compensation is inconsistent with the evidence, for aside from the water flowing in the subterranean portion of the stream as defined by the instruction, there is no evidence to prove the existence of any considerable quantity of percolating water in the tract condemned," etc. But the court might have gone further and said that there was no evidence to prove there was any percolating water, nor could there be any evidence to prove any such thing.

We cannot conceive what definition could be given of per-
1195 colating water from which there would be eliminated or to which there should be anything added, which is not found in these instructions. If these terms employed in the instructions in this case do correctly describe a subterranean stream, they just as correctly describe percolating water, and the two things are thus blended into one, and the court in this decision eliminates the percolating water, and makes water-course the one.

In instruction nine we say the court below made another error which ought not to have been permitted to go before the jury in a case already sufficiently complicated by the mass of scientific testimony introduced into it. It is where, after saying that the riparian proprietor cannot by sinking tunnels or making other excavations under the sides or underneath the bed of such water-course, draw away for use on non-riparian land, the waters, the learned judge says:

"If, for instance, the water of such stream percolates into the banks or bed thereof to any considerable, but limited distance, and such percolating water is stationary, or has very little motion, said riparian proprietor would have no right to make an excavation so as to draw off said percolating water, if the effect would be to cause any of the running waters of said stream to leave the same in order to fill up the voids," etc.

The chief objection to this instruction is, that there was no evidence in this case upon which to base it. It was the theory of the plaintiff, and its expert witnesses, as well as those of the defendants, that this water was not percolating from the stream a considerable distance into its banks, but that percolations were coming into the river through its banks and rising from the bottom; that there was, as the defendants insisted, a very large mass of this water that never did come into the river anywhere, and it was this large amount of percolating water which never became and could not become a part of the river, which defendants claim they own as percolating
1196 water, but which the lower court, by its instructions, deprives them of without just or any compensation.

There is another objection to the instruction, and that is its uncertainty. A "considerable but limited distance" does not give us any idea of the distance. It might be a mile, and if it were a mile, and at the end of that mile one should cut into its waters percolating from the banks of the river, it would not draw off from the river; it would lower the plane of these percolations for some distance from it, two, three, four or five hundred feet, according to the depth that one should go; but it is not possible that it would accelerate the movement of the water a mile from the cut, through the material that is here shown to exist. In other words, a mile of such material would furnish just as complete a dam and obstruction as though it were ten miles. And so of other loose phrases in the instructions, that left to the jury an almost unlimited discretion in finding the meaning of the instructions themselves.

Thus, in this same 16th instruction, in defining the conditions which may lead the jury to believe that these percolating waters are in fact the waters of a stream, the court speaks of the water passing through a wider or larger space in and through the interstices of the porous material, and in the same general direction as the surface stream, and in connection with it, and in a course and within a space reasonably well defined, the conditions being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy. Now, "same general direction," "reasonably well defined," and "de-

termined with reasonable accuracy," are terms so flexible that they could not possibly convey to the jury any definite idea about the direction, or the space within which they were confined; and certainly were stretching these terms beyond reasonable limits. Indeed, by these instructions (notwithstanding the ordinary surface channel is only from ten to twenty-five feet wide, and the storm channel only from one to three hun-
1197 dred feet wide), these subterranean waters must needs flow and be stretched from two and one-half to three and one-half miles wide in order to obtain banks and become a stream. Moreover, these instructions would as well define percolating water as any other. So with this rising and sinking; while courts may hold, and sometimes have, that these streams which rise and sink may nevertheless be water-courses throughout the intervening space where they have made their way through the subsoil, yet if we are to carry this further and say that although it is properly percolating water in one sense, it is nevertheless a part of the stream so far as the legal rights of owners are concerned,—we say, if we are to carry that a step further, and which has been done in this case, and say that that same thing may be true of waters which never did, and never do rise to the surface at all, but applies to an underground flow simply because it has the same general direction and confined within reasonable limits, we again repeat, this is to level all distinctions between percolating waters and water-courses.

On page 48 of the opinion of the honorable chief justice occurs this:

"Instruction number 29, requested by the defendants, and refused by the court, has so remote an application to the questions to be decided by the jury, that its refusal cannot be deemed an error."

If we are to understand that this is equivalent to saying the instruction was correct enough in itself, but was too remote to have any effect upon the case, we respectfully suggest that it is absolutely inconsistent with much with which the judge has been instructing the jury concerning what the bed of a water-course is. We asked the instruction defining that bed as the law writers, and the courts that have been called upon to consider this matter have defined it. The judge's instructions in defining this bed of the water-course, not only went beyond any limits ever given to that term before,
1198 but went to such an extent as that we say again it confounds all distinctions between all elements which constitute water-courses and percolating water. The bed of a water-course is, in its instruction, the equivalent of a river bottom. We know that in common speech there is a distinction made; that when one talks to a jury of a river bed and a river bottom, those terms convey two entirely distinct ideas. The instruction was not remote, but was of the most important character, if it is correct, and if there is any reason for rejecting it, it is because it was not the law.

But it is needless to go through each and every instruction given and such as were asked by the defendants and refused or modified, for the difference between the court and ourselves is not one that depends upon technical quibbles. There is the broad fundamental

difference between us as to what constitutes percolating water, and what is a water-course; and once more we would respectfully say that what constitutes these two different things have been defined time and time again, and that there never was a definition of a water-course that had any such range as has been given to it here, nor any such definition of percolating waters as circumscribed it within such narrow limits. The novelty of this case is in the decision of it, and not in the facts which it presented, for it is impossible not to conclude that this case, if it becomes the final judgment of this court, overthrows the law upon this subject.

A very near approach to the case is found in Myers *et al. vs.* The Tacoma Light and Water Company, 35 Pac., 601. The court in that case said:

"The authorities cited by the plaintiffs, as well as those cited by the defendant, established the doctrine that a flow under ground will be protected the same as one upon the surface, if it constitutes a stream with defined courses and boundaries. That which has given rise to difficulty and much diversity among the authorities, is as to the application of the rule."

1199 And after saying that counsel for plaintiffs insisted that the proofs were sufficient to authorize a finding that the water in question was so flowing as to be entitled to protection, the court said:

"The proofs in regard thereto, establish this state of facts,—that the whole valley or watershed of the stream had an underlying impervious stratum; that such stratum was covered by a deposit of gravel of various depths; that the trend of this impervious stratum from each side of the stream was in general towards the bed thereof. Upon these facts plaintiffs contend that this whole watershed should be construed as the bed of the stream, and that since the water which higher up the stream was flowing upon the surface could not get below this impervious stratum, it must flow below the surface, continuing to form a stream with undefined limits. There is nothing in the proofs in any manner tending to show that the water was confined to a space immediately below or near the actual bed of the stream upon the surface of the ground, hence the contention of plaintiffs can only be sustained by holding that the entire valley through which it flowed constituted the bed of the stream. No case has been cited that would justify such a ruling. It has never been held that a flow of water percolating through the sand and gravel of the hillsides which lead down to the bed of the stream, will be protected on account of the fact that such waters are confined to the valley to which the hillsides descend, and of which they form a part, by some underlying stratum below which the waters cannot go. If it had been shown by the proofs that the water all remained upon the surface until it arrived at a defined point, and then all disappeared, the conclusion might follow that it still retained its position as a stream confined to a bed substantially identical with the bed upon the surface; but no such fact was in any man-

1200 ner made to appear; there was nothing to warrant any other conclusion than that the water spread itself through the

gravel under and on each side of the stream, with no other boundaries than the underlying stratum of which we have spoken. There is nothing to at all indicate where or how, within such boundaries, the flow is continued. It may have appeared by inference that the waters, or a part of them, finally reach the lake, but there was nothing to show that they so reached the lake, in any other manner than by percolation in the valley through the bed of the stream."

*Id.*, 601, 602.

It is true in the same case, the court said:

"But so far as we have been able to discover none of the cases have gone so far as to hold that he would be thus protected as to water which was percolating through sand or gravel within limits not at all defined by anything appearing upon the surface, or made to appear by investigation beneath the surface."

But it is obvious that the court was not there speaking of what might be discovered of the general direction through the whole valley. In other words, the case distinctly excludes the possibility of a stream, or a water-course, where the trend of subterranean waters is known only by the mountains which bound the valley, or furnish the watershed from which they proceed.

## IV.

Concerning the pueblo rights, and its limitations to the ancient limits of the pueblo. Upon this point, as we understand it, the chief justice agrees with us: and while we admit that the Vernon Irrigation case is not exactly this case, yet the principles upon which it was decided ought to govern and control this, and logically must. If by the mere act of incorporating territory, the city of Los Angeles can carry this water to such extended limits, upon what principle does that right arise if it did not exist before? Did any one
1201 ever hear it suggested in any other case, that the incorporation of a city operates as a transmutation of titles from private individuals to the city? If A. or B. had a riparian right which today forbids the city from taking the water outside of the present charter limits of the city, and there selling to other people, is that riparian right divested by the mere act of incorporating that same tract of country into the city?

It has been laid down in the clearest terms, that these Spanish pueblos, by the very act of being created, became entitled to just four square leagues of land; but what is the point limiting the number of leagues, if it is then competent for the pueblo, and especially when it is brought under some foreign government, to extend its rights at its own pleasure?

Nor do we understand the force of the logic which sees in the rule a principle which would limit the city to the use of the water for exactly the same number of people, and, exactly the same purposes for whom and for which water was being used by the pueblo. In fact, Mr. Justice Temple, in making the criticism to which we here refer, does not tell us to what particular moment in the life of the pueblo these remarks were intended to apply.

When the pueblo is first created—it was formerly held—it becomes entitled to four square leagues and no more; and according to the decisions of this court, it did, by virtue of being a pueblo, become entitled to the use of the water as a sort of a trust for the use of the inhabitants for certain purposes. Now, certainly, we never should have contended that the right was limited to the use made at the very first moment of time at which the pueblo was created. One of the very objects had in view, was to build up the town, extend settlement, and develop its resources generally. This could not be done in a day or a week, or ten years. The law of appropriation as known in this State does not go to the extent of say-
1202 ing that one appropriation is measured by the extent of his use the first day that he does appropriate.

When water is appropriated for a particular purpose, a reasonable time to apply it to those purposes is allowed. So, we imagine, that as a pueblo right is a sort of trust for the inhabitants now in the pueblo, and such as should settle there thereafter, it could not be held that any period of time could mark the limitation of the right to the use of the water within the pueblo limits. But why say four square leagues, if in addition to the settlement of that particular tract, there may be incorporated one hundred and forty square leagues more, and the right increased accordingly?

Suppose the extension of the incorporation were such as to bring some other stream within the limits of the city, would the pueblo right attach to it? We think not. Its rights to the waters are to those waters which flow within the pueblo, and the right to their use is for supplying the pueblo. The reasons why we think that the outfall sewer to the sea is not one of the uses to which this water could be applied, (under the pueblo right remember), is that we can easily understand that this use might increase to such an enormous extent as would greatly impair the rights of the people to the use of the water for other purposes which undoubtedly came within the trusts, (if such they were), of the pueblo right for the benefit of the inhabitants, and which it was the Vernon Irr. Co.'s case held could be enforced.

We have contended many times, but without success, that it was absurd to say that the American city succeeded to the Spanish rights at all. The two are totally different; and if the United States, by acquiring territory, is to incumber itself with all of its colonial and State policies, and to succeed to the arbitrary or despotic powers of sovereignty that may happen to obtain in the country thus acquired, it were better for us if we never acquired anything. But the ruling of the court is that the city of Los Angeles did succeed to the
1203 pueblo right; and what we deny is, that private rights acquired from other Mexican grants, confirmed by the United States, and patented to private individuals, can be annihilated by such a blending of the Spanish pueblo rights and the American city's progressive needs.

And so with rights acquired form the United States under her pre-emption and homestead laws, whatever they were when they were acquired, they cannot be divested by municipal extension.

Nor does it at all follow that the position which we take here prevents the city from maintaining itself, or doing whatever it desires. What we are contending for in this case is, that if its needs be such, that to meet the demands of a modern city and its possible growth and development in the future, something more is required, it is in no lack of power to condemn, and we contend that it should be made to condemn, and pay that just compensation which the constitution endeavored to secure to every private proprietor. Whatever may be the needs of the city, those needs do not constitute title. If it has the title, we are not bound to draw upon the necessities of use, or the pleasures of lakes, for that title. If it has not, those things do not create it. But, says Mr. Justice Temple:

"It would be contemplated, or hoped, that at least some of these towns would outgrow the simple form of a rural village; that it was in the nature of things that this might happen, and when it did, and the communial lands were required for house lots, we must presume that under Mexican or Spanish rule, they could be so converted, and that when the population increased so as to overflow the limits of the pueblo, that such extensions could be legally accomplished."

Then follows this question:

"Had this happened under Mexican rule, can it be doubted that the right vested in the pueblo would have been construed to 1204 be for the benefit of the population, however great the increase would be?"

Now, the two things here mentioned are entirely different; that is to say, if the communal lands were required for house lots, we may presume that under Mexican or Spanish rule they could be so converted. We are not here contending for a narrow construction of the uses to which the pueblo might apply the water. But now when the pueblo has increased so as to overflow the limits of the pueblo, and we talk about an extension of the pueblo rights in the waters, we are talking about an entirely different thing. Whether if this had happened under Mexican rule the right thus vested in the pueblo could have been extended for the benefit of the increased population outside of the pueblo limits, however great the increase, and regardless of private rights which had vested in others in the meantime, is a question that we could hardly undertake to answer with any absolute certainty.

The Mexican Republic emerged from an imperialism that had for its fundamental maxim, "Whatever pleases the prince has the force of law." How far Mexican administration may have been tinged by the maxims of that jurisprudence which is the foundation of its own, we do not know. How far the absolute monarchy of Spain could have overridden private rights in behalf either of pueblos or any other public institutions, we are not prepared to say. But we can see nothing in the decisions of our own courts upon that subject that lead us to suppose that any such construction would have been given, even by the Spanish or the Mexican government.

The learning which has been bestowed upon these pueblo rights seems to have been almost completely undone by the most recent case decided by the Supreme Court of the United States touching

that subject. We allude to the case of United States *vs.* Santa
1205 Fé, 165 U. S., page 675, decided March 1st, 1897, after this appeal was taken, and not brought to our attention until after the briefs had been written.

We supposed that it was the settled determination of all the courts of the country, that a Spanish pueblo was, by the force of its very creation, entitled to and became vested with four square leagues of land, and no more. This was held in Hart *vs.* Burnett, 15 Cal., 530.

In Stevenson *vs.* Bennett, 35 Cal., 432, Mr. Justice Sanderson says:

"A pueblo, when once legally established and organized, according to the case of Hart *vs.* Burnett, 15 Cal., 541, became immediately entitled to all the rights and privileges which the general laws in relation to pueblos conferred, in the absence of any social laws or regulations which were sometimes provided, among which was the right to four square leagues of land, to be located in a square, with a plaza for a central point, if there were no natural obstacles in the way of such location," etc.

This same doctrine was, or appeared to be, declared in:

Townsend *vs.* Greeley, 5 Wall., 326; L. C. B. Co.'s U. S. Reports, Book 18, p. 547; Grisar *vs.* McDowell, 6 Wall., 3636 L. C. B. Co., 18 p. 436.

But this doctrine is all overthrown in United States *vs.* Santa Fé; and from that case it appears that these pueblos were created in two ways. Generally by a contract with individuals to establish a town, and sometimes they were created by the government itself. But that they did not take any lands by virtue of their creation. But in case of the contract, a grant was made which was of four square leagues, but was frequently less, and sometimes more.

These cases above cited are reviewed and practically overruled on this subject.

It furthermore appears from that case, 165 U. S., 683, 684, that when this land is granted for the pueblo, it must be so that the boundaries of said territory be at least five leagues distant
1206 from any city, town or village inhabited by Spaniards and previously settled; that it cause no prejudice to any Indian tribe nor to any private individual. And furthermore, even when the grant is made, such private rights as already existed within the four square leagues, were unaffected by it. And again, this pueblo right, even after the lands were granted or assigned to it, the interest acquired by the pueblo was far from being an indefeasible estate such as is known to our law.

The purpose to be accomplished by the creation of a pueblo did not require their possession of a fee. The interest amounted to little more than a restricted and qualified right to alienate portions of the land to its inhabitants for building or cultivation, and to use the remainder for commons, pasture lands, or as a source of revenue, or for other public purposes. And this limited right of disposition and use was in all particulars subject to the control of the government of the country.

*Id.*, 713.

From what is here decided it would seem that neither in their creation nor by extension would their pueblo grants be permitted to interfere with private rights.

We cannot help thinking that in spite of the fact that these legislative acts which have attempted to confer upon the city of Los Angeles more extensive rights in these waters than by any law existed, have been denounced by the court, and it has been declared that they could not transfer any rights as against private proprietors, which did not already exist in the city, have nevertheless had more or less influence both in bringing about this verdict, and the approval thereof.

Mr. Justice Temple next says he cannot see why the interpretation of the original grant should be more narrow than of the title acquired by condemnation. If the city should now, in this proceeding, purchase the riparian rights for the use of the city, must it do so again whenever its present limits may be enlarged? We are asked:

1207 "Suppose in 1850, the little city then existing, had condemned for its use all riparian rights, and had no other right to the water. The extent of a taking by condemnation is always limited to the necessity which justifies it. That which is not used still belongs to the owner. The title to water would not be acquired, but only the use; and as against the riparian owners, in such a case, the city could not have taken water not needed by the city and its inhabitants. In 1850 the city contained only a small population, and its corporate limits were less even than the pueblo limits."

We think in this he is mistaken, but, continuing, he says:

"In the supposed case, could the land-owners now contend that the larger city could not under the right acquired in the condemnation proceedings, supply the inhabitants of the additional territory? As to such a claim I think there would be but one opinion," etc.

Now there is here a sort of contradiction in terms that makes it difficult to understand exactly what is the position taken. If the city in 1850 had actually condemned for its own use all riparian rights and paid for them, it would seem that that would end the matter quite as much as the purchase of all riparian rights at the same time; but if the extent of the taking by condemnation is always limited to the necessity which justifies it, then it has narrower limits than the right acquired by purchase, and we do not see how there could have been a condemnation of all unless all was necessary. If there had been a condemnation of part only, if there had been a condemnation limited to a certain number of inches measured under a four-inch pressure, and which condemnation had extinguished all riparian rights to that extent, then when the city's needs grew larger, the city's rights would not have extended under that condemnation. If all had been originally condemned, there

1208 would be nothing further to condemn. But if this remark is to be taken literally, namely, that the extent of the taking by condemnation is always limited to the necessity which justifies it, how can this verdict and judgment be upheld? Does anybody pre-

tend that there is a necessity for anything more than the city has now got? It is claimed anywhere in this case that what we have heretofore stated, namely, that a large quantity of the waters of the Los Angeles river, after all rights are subserved, is still going to waste in the sands, is not true?

The ground upon which the learned judge of the court below put this matter was, that the city had the right to condemn not only for its present uses, but also for such uses as it might reasonably anticipate in the near future. He has authority for that undoubtedly; so that the condemnation is not always limited to the necessity at the moment it is made. What we complained of here was, that a provision was being made so far ahead that nobody either did, or by any possibility could know that it would even be necessary at all.

On page 46 of the opinion, the chief justice says, that one of the objections to these instructions which appellants urge in the arguments is directed against the charge, repeated in several places, that the value of the property at the date of the summons must control. The hardship of this rule is admitted in a case of this kind, and it is said that our argument against the constitutionality of this feature of the statute would not be undeserving of consideration, if we were in a position to urge it; but that in fact this portion of the charge was given in form and substance as we requested it in the instructions proposed by ourselves. To this we might answer, first, that it had been so ruled throughout the trial, that that was what *was* we had to be governed by, and we had no choice but to conform to it.

At folios 4159, 4160, the court says of the first instruction which we asked, "Given, (see No. 2)." No. 2 will be found at folios 1209 4032, 4033. Now compare the two and it will be seen that our instruction was not given. So far as the time at which the value should be considered was concerned, the ruling was already against us. But what we were doing in this instruction was, to fix the measure of compensation as the actual value at that date; and the court in the second instruction where it gives this, does give the language which we use, namely, the actual value at that date.

But, now, we have shown that the court repeatedly instructed the jury that it was the market value, and at still other places that it was the actual market value.

Possibly we may have made some mistake in the exact manner in which this view should have been presented, but when the Government is seeking to take the property of a private individual for its own use, it is submitted that we ought not to be impaled upon a pin's point of practice. To our minds there is really no objection to the statute, if it be construed as we say it ought to be, and, indeed, according to the very terms of the statute itself. The statute declares that it is the actual, not the market value.

Now, we think the object of making the date of the summons the time of measuring the value, was to exclude or to debar the defendants from making improvements upon the property after the condemnation proceeding is commenced. We can easily see that were one entitled to recover for such improvements, a municipal or other corporation seeking to condemn for a particular specified pur-

pose, might find the value of the property really depreciated for that purpose, by the very improvements which, nevertheless, it might have to pay for if it took it at all.

Now, if the statute be construed as we claim it should be, that making the date of the summons the time of measuring the value, secures the public against being defrauded, and by taking the actual value, secures to the owner a just compensation. For all of the natural value and wealth of this property, that does not depend
1210 upon man's hand, but it was just as great the day the summons was issued as it ever has been since. It was as great ten years before, yet ten years before there was not even the knowledge of the existence of this water in any considerable quantities. But the city is permitted to go upon this land and make borings, and it discovers a vast amount of water; having discovered it (although as already stated full knowledge was not possessed), it knew enough to have some conception of its enormous value. Immediately a complaint is filed, even prematurely, and a summons quickly follows, and then advantage is sought to be taken of the want of knowledge on the part of the public generally of its value, because, forsooth, that ignorance would affect the market value.

If there are any percolating waters in this land, under the definitions which have been fastened upon that term here, their existence was not known at all, either to the city or anybody else. Hence, if the market value at that time was the measure of compensation, it did not have one cent's value on that account.

But since the commencement of this suit, its actual value has been discovered. No, not discovered (for it was discovered by the city before), but it has since been demonstrated, and which was formerly matter of inference and opinion has become through our subsequent developments a matter of certainty and it is now known to be worth at least one and a half million of dollars, and that at a very low estimate. But, says Mr. Justice Temple, the supposition of the discovery of a gold mine is an impossible one, for the actual value could not be discovered in a day, nor could it be discovered at all until the mine was worked out; and hence it is market value after all that we are speaking of. But is not the learned justice here making the mistake of insisting that at the date of the summons certainty, or nothing, are our only alternatives? Suppose that a gold mine had been discovered the next day after this summons
1211 was issued, and that in the three years that intervened between the issuance of the summons and the trial of the action, there had been development work enough done to show the fact that there was a true ledge of enormous proportions, and assaying from various localities tremendous returns, we could not then have known the actual value, if the meaning be that we could not have known it with absolute certainty.

If the want of absolute certainty furnishes any objection to actual value, why is not it equally an objection to market value? Of some articles it may be true that the market value may be ascertained with approximate correctness, and without much trouble, but those are only certain kinds of property that are not usually the subject

of condemnation at all. The testimony of experts here on the market value, ran, as we have already said, from six, seven or eight thousand dollars to thirty-five or forty thousand. The jury finds twenty-three thousand. That was a sum that nobody testified to. Now, how do we know what the market value was? In no way at all, except that the verdict of the jury is conclusive. But if we had been applying the rule which we say should obtain, namely, actual value at the date of the summons, the jury would have been entitled to every fact that had been subsequently discovered as bearing upon that question. They might have taken the opinion of these various witnesses upon that subject. They might have done just what they did—come to a conclusion slightly different from any of them. But imagine any condition you please, the actual value can be determined with as much exactness and with as much ease as the market value.

Now, it seems to us that the course pursued by us is sufficient to entitle us to be heard on exactly that question; and that the real point is, that, as the constitution says "just compensation," if the statute had said market value at the date of the issuance of the summons, it would have been unconstitutional. We have had to meet in the case, all sorts of theories and all sorts of opinions, 1212 but the more we reflected the more we were persuaded that the difficulty was not with the statute,—that it was not unreasonably to fix a time at which the value should be determined, and for reasons before stated,—but that the value should be the actual value. And we say again, if the statute is to be interpreted as meaning "market" value, it is unconstitutional, and if the statute is constitutional, then the instructions are wrong.

It will be observed in the instructions we asked, that we never asked the court to instruct the jury to find the market value at any time.

In addition to the authorities which we have already cited upon this subject, we would invite the special attention of the court to the case of

Virginia & Truckee Railroad Co. *vs.* Henley, 8th Nevada, 171.

Their constitution is substantially the same as our own. It is a just compensation that must be paid before property is taken; and, said the court:

"Upon this language, although the words 'compensation' and 'damages' are used, of course in the received and construed sense, petitioner insists that the measure thereof is filled by giving the private person the market value of the land taken. If such was the intention of the legislature, apt language has not been chosen to express it; and if such language had been used as of necessity clearly expressed such intention, then the act in that regard would have been opposed to the constitutional provision of the United States and of this State, forbidding the taking of private property for public use without 'just compensation,' and not only so, but to the practice either of written or unwritten law of every civilized people. Upon principle and precedent the proposition is monstrous. While the law

does and should provide in proper case for the surrender to the public use of individual property, so that no stay shall im-
1213 pede the general necessity, on the other hand it must jealously guard the rights of individual owners. They are never to be remitted, as counsel suggests, to litigation, for all matter of loss save the naked market value of the property taken without just compensation 'first made or secured.' It is difficult to imagine an unjust compensation; but the word 'just' is used evidently to intensify the meaning of the word 'compensation;' to convey the idea that the equivalent to be rendered for property taken shall be real, substantial, full, ample; and no legislature can diminish by one jot the rotund expression of the constitution. So are all the decided cases. While courts have differed upon minor points, two of which the statute of this State settles, namely, the allowance for particular benefits derived from the construction of the railroad and the exclusion from the calculation of damages of the cost of necessary cattle-guards and fences where the petitioner offers to construct; yet upon the great substantial underlying basis, upon which only can arise a constitutional law for the taking of private property for public use—the absolute protection of the individual by just compensation—there has been, could be, no dispute."

This states the law as we have been trying to state it. We do not think the statute is unconstitutional if correctly interpreted; and in the instructions which we asked, we think we did correctly interpret it as meaning actual value; but this has been taken away by repeated instructions on the part of the court, that it is "market" value. See instructions 11, folio 4047; instruction 12, folios 4051, 4052; instruction 26, folio 4095; where they are distinctly told that the thing they are to determine, is such actual market value at the date stated. And in instruction 29, folios 4099, 4100, this qualification of actual value is taken away and the jury told that:

1214 "Wherefore, if you believe that said waters did not give said lands an additional market value at that date, or if an additional market value were given, but the same did not equal the real value of said waters, then you must place on said lands a valuation equal only to the market value which they then had, including such additional market value which said waters gave to said lands, irrespective of the true value of said waters."

Thus it will be seen in these instructions, as well as in the opinion of the court to which we have just referred, (and a thousand cases of a like character can be cited), that there is a difference between the actual value and the market value. The two may, of course, often coincide, but that does not affect the question of the difference between them. These distinctions were before the mind of the learned judge who gave these instructions, but yet he drifts from one to another view in such a way as must have confused the jury, at least, and most probably fixed before their minds the idea that market value was alone to be considered. But if the difference exists, and the jury were instructed both ways, the verdict should be set aside for that reason; and to that we add that it should be set aside for the reason that the view for which we are contending

here is correct, and that it is in that way only that the constitutionality of the statute can be maintained.

But says Mr. Justice Temple:

"The phrase 'actual value' is sometimes used in contradistinction to market value to indicate that property is valued too high to make it a good investment. If the market value of the land was one hundred dollars per acre, it would not be permissible to show that the real or actual value was less, and that the market value was inflated. The owner could get the market value, and less would not make him whole. The Government can take private property for its use at any time, conditioned only that the public shall
1215 compensate the owner, that it shall pay what it is worth when taken. This value must be the market or exchange value, for there can be no other. Value, which determines the price at which the owner must sell, must be the exchange or market value, and actual value means actual market value."

In answer to this we should say, that it certainly has never been the understanding that actual value and market value, and actual market value, are one and the same thing. It is absolutely certain that the learned judge of the court below, in giving his instructions to the jury, while he uses these things interchangeably, is in fact intending to convey to the jury, the idea that they are different things.

Said Judge Simonton, in the case of Rugheimer, 39 Fed. Rep., 376:

"I am not prepared to charge you as requested, that in determining compensation we are in every case bound to confine ourselves to the market value of the property as fixed by experts, and to that only. The owner, in cases of condemnation, does not offer the property for sale, nor is there any contract of sale. The market value of property has a controlling influence when the price is to be fixed after a contract is in question. This market value of real estate put up for sale, is determined by the opinion, judgment, whim, necessity, or caprice of others. Compensation in cases like this before you, is somewhat influenced by the circumstances and personal relations of the individual to be compensated. His property may have a special value to him which it could not have to any one else, and when he is called upon to make a surrender of it for public use, he is entitled to have this special value estimated, if it exists and can be measured by money. So while the market value of this property necessarily must enter as an essential and important element of compensation, and in
1216 many, perhaps most, instances, is the sole element, it may or may not be the sole measure of compensation. * * * In estimating what is just compensation, you must inquire what he will lose by parting with it to the United States. He is entitled to this and no more than this. What he will lose, not remotely, but approximately directly, as the immediate result of the acquisition of the lot by the United States, and fix the sum which in justice to both parties, the United States should pay."

Many cases to the like effect may be cited. Now to the supposi-

tion of the learned justice last referred to, we should make this answer. It has been repeatedly decided that the party whose property is sought to be condemned is entitled to have the property valued for that purpose for which it is most valuable. That has not only been decided in this court in Neale's case, the San Diego flume case, but it is held in Northern Pacific & M. R'y Co. *vs.* Forbis, 39 Pac., 571; Montana R'y Co. *vs.* Warren, 137 U. S., 348, and in Montana R'y Co. *vs.* Warren, *et al.*, S. C., 12 Pac. Rep., 641; in Boom Co. *vs.* Patterson, 98 U. S., 403; and in this latter case it is also said that property is not to be deemed worthless because the owner allows it to go to waste, or to be regarded as valueless because he is unable to put it to any use. Its capability of being thus made valuable, gives it a market value which can be readily estimated. And this case also approves Young *vs.* Harrison, 17 Ga., 30, in which case the value of farming land at a bridge site was allowed to be proved. In one of these cases there was no boom, and in the other no bridge; yet the availability of the spots for such purposes, was an element of value to be considered.

Another case to this same effect, and one which has considerable bearing here, we think, is

Little Rock, etc., Co., *vs.* Woodruff, 4 Am. St., 56.

There the railroad company was seeking to condemn the
1217 land for the purpose of constructing a bridge, and it was claimed in that case that the owner was not entitled to have the land valued for its eligibility as a bridge site because under the law of that State that was something he could not avail himself of; that he had no right under the law of Arkansas, to build a bridge. But the court overruled that contention, and held that the owner did have the right to have it valued for that purpose.

See also Little Rock *v.* McGehee, XI. Ark., p. 202, a case where the owner of land worthless for cultivation or habitation was held entitled to recover its value for purposes of a ferry landing, and

Paine *et als. vs.* Kansas, 46 Fed., p. 546, where the same doctrines are declared on authority of Boom Co. *v.* Patterson, and where it was held further that an increased servitude on the land beyond that declared in a prior condemnation proceeding would give the owner a right to additional "just compensation."

Now, under these decisions and the California cases, which are numerous, (but already cited in the briefs heretofore filed,) we should say that if the greater value which the property sought to be condemned possessed, was for immediate sale upon the market the owner would be entitled to this value. Here, of course, market value and actual value would be one and the same thing. This coincidence frequently happens, but not for that reason should this court obliterate or confound the distinction between them.

In these cases there is no contract of sale, and the case is not one of sale. It is the Government proceeding, contrary to the will of the owner, to devote the property to a public use in spite of him. And the constitution says that just compensation should be made. If market value is not just compensation, then it does not meet the

demands of the constitution. And it is difficult for us to imagine how the loss of a property, worth a million and a half of dollars at the very least, on any rational consideration of the evidence
1218 here, to the city, or to any other purchaser, is justly compensated by the payment of only twenty-three thousand dollars to the owners. It is not "just" compensation but confiscation.

Now, it seems to us that the solution here of the difference between the statute and the constitution on the one side, and the contention of the majority of the court on the other, is not so very difficult. Let us suppose a case.

A. is the owner of a tract of land, situated near a populous city, having many attractive features, making it desirable in the judgment of B. for villa or suburban lots. It has some peculiar attractions to A., and B. in purchasing it for the purpose of subdividing and improving it for the purposes referred to, pays a good round sum, perhaps a little more than the intrinsic worth for agricultural purposes merely. His enterprise contemplates the subdivision of the property, laying off and improving streets, and putting it in a condition to be most attractive to the public for the purposes which in his judgment gave it its greatest value. All of the shrewdest real-estate dealers in the country concur with him in his judgment of what constitutes its greatest value. But in order to fix that value, into a market value, these improvements must be first made and then the property brought to the attention and knowledge of the public. This is done before it has its value upon the market, or rather this market value. But just as he has begun putting it into condition with a view to placing it upon the market in such ways as to bring the knowledge of its desirability to the public and determine its market value, the Government files a condemnation suit and issues a summons. Now, because of the lack of the understanding of its situation and its attractiveness to the public generally, it has not attained to a market value. The statute says he shall have the actual value. The constitution says "just compensation."
1219 Is he receiving either when the amount of his compensation is to be measured, not by the intrinsic merits of the property, or any special features which it possesses, but the compensation is measured in a very large part by a thing which is totally extrinsic to the property itself, namely, the public knowledge, or public ignorance of it.

Again, it is said that the party is entitled to a value not measured by an immediate forced sale, but by taking time such as is reasonably necessary for disposing of such a property, and upon customary terms. Is there any objection to its also including time for reasonable efforts, both to develop what features of extraordinary value it possesses, and bring them to the attention of the public?

In our case the city did know very much more about the wealth of waters in these lands at the time this suit was commenced, than was known of the mining prospects in the Montana case, and so did Pomeroy and Hooker; but the investigations which had already been begun were carried on until in a short time after the summons was issued, a few months, the facts were pretty well known

to the two parties most immediately interested. And yet doubtless it is true that they were but little known to the general public.

But market value in its true sense, always is affected largely by this extrinsic element of public opinion, and that element the statute surely must have intended to exclude when it spoke of actual value rather than market value, and which the constitution does not take into consideration when it speaks of just compensation. Of course it may be said still, that it is exchangeable value, and not a mere fanciful or imaginative value; but that does not exclude the further interpretation, that developments subsequent to the issuance of the summons, may show that it had an exchangeable value at the date of the issuance of the summons much greater than its then market value. That is to say, that its qualities, if they had been
1220 then known to the public, were such as would have given it an exchangeable value in excess of its then market value.

If the defendants in this action had the most complete knowledge of everything that concerns it, or everything that was subsequently developed, that ever has been known concerning it, but yet the time not having been considered opportune for bringing it upon the market and to the attention of the public, would still have found themselves dispossessed of their property for a sum of money vastly less than they themselves knew it to be worth, not because the property did not possess the value, or that they did not know that it did, but because, forsooth, somebody else was not aware of it, and the property for its most valuable purposes actually had no market value.

It is said that a farmer residing in the neighborhood may give his opinion of the value of property in evidence, although he may not have known of a single sale. What is that but testifying to its actual rather than to its market value? Yet such evidence is always held admissible, and was in Montana R'y Co. *vs.* Warren, 12 Pac., 641. It was very correctly said there, too, that in a newly settled country, where lands have been settled and improved, but where no sales have taken place, such lands would have no market value in the proper sense of that term, and under the principle contended for here by the majority of the court, such property could be taken for a mere nominal consideration, because, forsooth, what one is entitled to is only market value.

We made the point in our opening brief, (see paragraph IX., pages 150 to 156, especially 154), that certain findings were not sustained by the evidence in this—that it was not shown that the city complied in anywise with the law or took the preliminary steps required to entitle it to bring this condemnation suit, and more especially in this: That one of the ordinances under which it claimed the right to bring the suit never took effect until the day after the com-
1221 plaint was filed, (see page 154 of our opening brief); that the ordinance of March 5th, 1895, was not passed until long after the filing of the complaint and issuance of the summons, and could be no authority for the maintenance of it. (Same page.) That no formal adoption prior to the suit was made by the city of any detailed plan of the headworks.

This court, without the citation of any authority, disposes of the entire matter in the following language:

"The object of publishing laws and ordinances before they take effect is to warn those who are to be bound by their provisions. In a case like this, where an ordinance has been duly passed, and an order for its publication has been duly made, the act of an officer obeying its directions in anticipation of its publication, is at least ratified and made good when the publication is complete."

We respectfully suggest that this view, upon the reasoning and authority of Madison *v.* Daley, 58 Fed. Rep., p. 753, is not correct.

That was a case which arose under the Revised Statutes of Indiana. The statute is similar in its effect and force to the provisions of section 4 of the Statutes of 1889, page 400, under which the city council of Los Angeles should have proceeded. That statute declares:

"It is the duty of the legislative branch of any municipality, contemplating permanent improvements, to advertise for plans and estimates of the cost of such improvements, made by a competent engineer or architect * * * before the question of incurring the indebtedness for such improvement is submitted to vote."

This court holds in this case that the council was not bound to first comply with the above statute.

The Federal court case above cited, takes a radically different view of the fundamental principles underlying this class of cases, and we respectfully submit it is one more truly in consonance
1222 with the idea of awarding "just compensation" to the citizen for property taken from him against his will, through the exercise of that supreme attribute of sovereignty defined as the power of eminent domain.

The opinion states the question so finely, that we quote rather fully what is said therein, from volume 58, at page 753, and submit that upon the reasoning therein set forth, the judgment herein should be reversed, because the city council of the city of Los Angeles did not comply with the above statute of California, prior to the filing of the complaint:

"First. Section 3167 of the Revised Statutes of Indiana, under which the plaintiff attempted to proceed, is as follows:

'Before any matter of the opening, laying out or altering of any street, alley, highway or water-course, or of the vacation thereof, shall be referred to the city commissioners, the common council shall refer the matter to an appropriate committee, who shall examine the matter and report at the next meeting of the common council upon the expediency of so referring; and if the common council shall determine, by a two-thirds vote, to submit the said matter to the commissioners, it shall be so ordered, and it shall thereupon be referred to said commissioners, as hereinbefore provided; but no such matter shall be submitted unless so ordered by a two-thirds vote of said common council.'

Now, it is not claimed that this requirement of the statute was complied with by the common council of the plaintiff before referring the matter of the condemnation of the defendant's wharf to the city commissioners. It is contended by the counsel for the de-

fendant that this provision of the law is mandatory, and that the preliminary reference therein required is jurisdictional. The object of this statutory requirement is twofold: (1) In order that the
common council may, by the careful and deliberate investi-
1223 gation of one of its committees, acquire a full knowledge of all the facts and circumstances surrounding the proposed acquisition of property by the exercise of the power of eminent domain. (2) For the protection of the rights of the owner of the property which it is proposed to condemn; for the law is jealous of the rights of property-holders and adopts these formalities of procedure for their protection. With these objects in view I will consider the language of section 3167, *supra*. It is that: 'Before any matter of the opening,' etc., 'shall be referred to the city commissioners, the common council shall refer the matter to an appropriate committee,' etc. 'Shall' will be construed 'may' where no public or private right is impaired by such construction; but where the public are interested, or where the public or third persons have a claim *de jure* that the act shall be done, it is imperative; and will be construed to mean 'must.' The right of eminent domain—that of taking the property of a private citizen without his consent, and devoting it to the use of the general public—is an exercise of the highest act of sovereignty. It can only be called into existence by the authority of the legislature, and must be exercised in the mode and by the tribunal provided by law. This statute prescribes the mode, and I have no doubt whatever that it is mandatory. The failure of the city council to comply with it is fatal."

## VII.

In the concluding part of the opinion of the chief justice rendered in this case, it is determined that the item of $767.45 paid by defendants for the cost of a daily transcript of the notes, is not proper chargeable as costs, and the decision, it is said, is governed by section 274 of the Civil Procedure, as amended in 1880.

Replying to this we contend that the right of the defend-
1224 ants to costs is not dependent at all upon any statutory rule, but it is a constitutional rule, and comes within the definition of "just compensation." The point has been squarely decided by the supreme court of Washington in the case of

Adams County *vs.* Dobschlag, 53 Pac. Rep., 339.

In that case the court construed a statute which declared that when such proceedings are instituted against a person to whom a tender has been made, and such person shall fail to recover judgment for a greater sum than the amount tendered him, such nonconsenting owner shall not recover costs.

On appeal to the supreme court, the latter said:

"It was held by this court in Peterson *v.* Smith, 6 Wash., 164, 32 Pac. Rep., 1050, that under the constitutional guaranty the owner of the land could not be compelled to present a claim for damages; that he could remain quiet, and be assured that, before his property was condemned, the county must ascertain his damage, and either

pay it to him, or pay it into court for his benefit; and the amount of his damage must be ascertained in a court, in a proceeding instituted for that purpose, and in which the defendant could appear and make his showing, if he so desired. * * * The proceeding instituted for the purpose of determining this damage was the proceeding in the superior court, and not the proceeding before the county commissioners, and the land-owner must not be put to the expense of litigation in order to preserve the constitutional right to have the amount of damages determined by a court in a proceeding to which he is a party. We appreciate the argument advanced by the respondent that the owner whose land is sought to be subjugated to the use of the public will be encouraged under such construction of the constitution always to litigate the question of damages, and to refuse the amount tendered, for the reason that he will be held harmless so far as costs are concerned; but we think the
1225 plain provisions of the constitution prohibit us from entering into a consideration of public policy in this connection.

The judgment will therefore be reversed and the cause remanded with instructions to the lower court to modify the judgment to the extent of taxing the costs to the county."

There is no contention that such daily transcript was not absolutely necessary as a matter of costs, and to enable the defendants to make a proper presentation of this tremendously burdensome case, and we submit the item should have been allowed to us as within our constitutional right.

## VI.

We have extended this petition so far, that we are greatly apprehensive that it will be difficult to obtain a patient and attentive reading of it. Our excuse is found partly in the gigantic importance of this case to the clients whom we represent, partly in the importance of the questions which are here discussed to the public generally, and the influence which this decision must have upon the people of the State generally, and partly in the inherent difficulties of drawing accurate and correct distinctions and clear, concise definitions of the various terms employed, and the different principles of law which may be applicable to one phase or another of these questions; and we shall not undertake to give any discussion to the various objections to the admissibility and excluding of evidence in this cause, but leave them to be further considered or not as the court may see fit, or have the leisure, upon the remarks which have already been made in the briefs fieled herein.

We do desire, however, to bring once more to the attention of the court, one of those questions. It was the overruling by the court of our objections to the testimony of the witness Charles Foreman, as to what he heard in the month of June, 1893, concerning Pomeroy and Hooker's trying to sell the land to the city for thirty thou-
1226 sand dollars, and that the city refused to give it, and nobody else did give it, and the overruling of the objection to the questions put to Wicks, and his being permitted to testify as to what he saw in newspapers concerning them. (See specifica-

tions, folios 4279, 4281); and to the questions put to Foreman (folios 2733, 2734); and *for* the questions put at folios 2766 and 2768, and to the objections there made. Just such evidence was held to be utterly incompetent as a basis of estimating value in City of San Luis Obispo *vs.* Brizzolara, 100 Cal., 434, and its introduction here could not fail to be prejudicial to the defendants in this action.

We respectfully submit that a rehearing should be granted.

JOHN J. NORTH,
R. H. F. VARIEL,
J. S. CHAPMAN,
*Attorneys for Appellants and Petitioners.*

1227 *Minute Order, July 3rd, 1899.*

By the Court in Bank.

CITY OF LOS ANGELES *vs.* POMEROY ET AL. } L. A., No. 419.

By the court:
Rehearing denied.
July 3rd, 1899.

1228 *Copy of Judgment and Remittitur Issued by the Supreme Court.*

Bank.

JUNE 3RD, 1899.

THE CITY OF LOS ANGELES, Respondent, *vs.* A. E. POMEROY ET AL., Appellants. } L. A., No. 419. On Appeal from the Superior Court in and for the County of Los Angeles.

And now, at this day, this cause being called, and having been heretofore submitted and taken under advisement by the court, and all and singular the law and premises being by the court here seen, heard, understood, and fully considered, the opinion of the court herein is delivered by Temple, J.

We concur: McFarland, J., Henshaw, J., Garoutte, J. Harrison, J.

Whereupon it is now considered, ordered, adjudged, and decreed by the court here that the judgment and order of the superior court in and for the county of Los Angeles in the above-entitled cause, be and the same are hereby affirmed.

Remittitur issued July 5th, 1899.

1229 [Endorsed:] L. A. 419. In the supreme court of the State of California. City of Los Angeles *vs.* John D. Hooker, *et al.* Petition. Filed June 27, 1901. Geo. W. Root clerk by A. W. Johnson deputy. J. S. Chapman, attorney-at-law, rooms 100–'3 Potomac block, Los Angeles, California.

1230 UNITED STATES OF AMERICA:

CITY OF LOS ANGELES, Defendant in Error,
vs.
JOHN D. HOOPER and A. E. POMEROY, Plaintiffs in Error.

To the Honorable William H. Beatty, chief justice of the supreme court of the State of California:

The petition of J. D. Hooper and A. E. Pomeroy respectfully shows: That on the 8th day of June, 1893, they were the owners in fee-simple of two certain tracts of land, contiguous to each other, and forming one tract, and fully described in the complaint hereinafter referred to, and embracing in the aggregate 314.82 acres of land, and which said tract of 314.82 acres lay partly within the Rancho San Rafael in the county of Los Angeles, State of California, partly within the Rancho Providencia, and a tract of land known by the name of Cahuenga. That the San Rafael rancho was granted by Pedro Fajes, the Spanish governor of California, to Julio Berdugo, on the 20th day of October, 1784, and was a tract of eight square leagues, situated in what is now the county of Los Angeles, and bounded upon the western side by the Los Angeles river, and the same was subsequently confirmed to Jose Maria Berdugo by the Spanish authorities on the 12th day of January, 1798, and after the acquisition of the tract by the United States, the claim to the said tract was presented to the board of land commissioners appointed to ascertain and settle the private land claims in the State of California, being the act of Congress approved March 3, 1851, on the 21st day of October, 1852. And the said claim was by the said board confirmed on the 11th day of September, 1855, and was finally confirmed by the United States district court on the 4th day of June, 1857, and thereafterwards, to wit: on the 28th day of January, 1882,
1231 a patent was duly issued by the Government of the United States granting the said tract of land known as the Los Felis rancho to said claimants.

That the Providencia rancho was on the 23rd day of March, 1843, granted by Manuel Micheltorena the then Mexican governor of both the Californias to Vicente de la Ossa, and afterwards, and before the 11th day of September, 1852, David W. Alexander and Francis Mellus succeeded to and became vested with all the right, title and interest of the said Vicente de la Ossa, and on the said 11th day of September, 1852, they filed their petition before the board of land commissioners for the settlement of land titles in the State of California, appointed under the act of Congress aforesaid, for the confirmation of their said claim, and on the 18th day of October, 1853, the board of land commissioners rendered a decision in favor of the said claimants, confirming the said grant, and afterwards an appeal was taken by the United States to the district court of the United States for the southern district of California, and thereafter it was by the said district court ordered, adjudged and decreed that the decision of the land commissioners should be and was confirmed, and that the claim of the said Alexander and Mellus was valid.

An appeal was afterwards taken to the United States Supreme Court from the said decision, which said appeal was dismissed, and a patent was issued by the United States Government to the said Alexander and Mellus on the 6th day of August, 1872, and was duly recorded in the office of the county recorder of Los Angeles county on the 14th day of April, 1873. Final decree of confirmation by the district court was made at its December term in 1856.

That on the 5th day of March, 1843, Manuel Micheltorena, then the Mexican governor of the department of both Californias, granted to one Jose Miguel Triunfo that certain tract of land known by the name of Cahuenga, situated in said county of Los Angeles. That prior to the 8th day of November, 1852, Francis Mellus and David W. Alexander and Augustin Olvera acquired all the
1232 right, title and interest of the said Jose Miguel Triunfo in the said tract, and on the said 8th day of November, 1852, presented to the said board of land commissioners their petition for the confirmation of their title to the said tract, and on the 15th day of November, 1853, the said claim was confirmed by the said board of land commissioners, and afterwards and upon an appeal to the district court of the United States for the southern district of California, the said district court at its December term in 1856, rendered its decree confirming the said claim, and decreeing that the claim of the said Alexander, Mellus and Olvera was good and valid; and thereafter on the 2nd day of August, 1872, a patent was duly issued by the United States to the said persons, giving and granting the said tract of land known as Cahuenga to the said petitioners.

And your petitioners further show that they by divers mesne conveyances did, prior to the said 8th day of June, 1893, become vested with the title in fee-simple to the said 314.82-acre tract, and under and through the said Spanish and Mexican grants and the confirmation thereof, and the said patents issued by the United States founded thereon.

That on the 25th day of August, 1844, the said Manuel Micheltorena then being the Mexican governor of the department of both Californias, granted the city or town of Los Angeles a certain tract of land, and on the 26th of October, 1852, the mayor and common council of the city of Los Angeles filed their petition with the commissioners appointed to ascertain and settle private land claims in the State of California, under the act of Congress aforesaid, in which they claimed the confirmation of that title to a tract of land designated as the city of Los Angeles containing 16 square leagues, situated in the county of Los Angeles and in the State of California, their said claim being founded on the said grant to the said city made on the 25th day of August, 1844,
1233 by Manuel Micheltorena as aforesaid, and on the 5th day of February, 1856, the said board of land commissioners rendered a decree of confirmation by which it was by the said commission adjudged that the claim of the said petitioners was valid for the land thereafter particularly mentioned and described, and that as to those lands, the same was confirmed, and as to the remaining portion of the premises described and claimed by them in their petition

to the said commission, it was adjudged that the claim was invalid, and the application for confirmation was rejected. The land of which confirmation was made was situated in the said Los Angeles county and contained four square leagues of land. From which decree an appeal was taken to the district court of the United States for the southern district of California, both by the United States and by the mayor and common council of the city of Los Angeles, and both appeals were subsequently abandoned, and thereupon it was by the district court aforesaid ordered that the appeal of both parties in the case should be dismissed, and that the claimants should proceed under the said decision as under a final decree, and such proceedings were thereafterwards had that on the 9th day of August in 1866, a patent was issued by the United States to the mayor and common council of the city of Los Angeles for the said tract of land so confirmed. That on the 8th day of June, 1893, the city of Los Angeles, the successor of the said mayor and common council of the city of Los Angeles brought a suit in the superior court of the county of Los Angeles for the purpose of condemning the said tract of land of your petitioners, being the 314.82-acre tract, and to ascertain the compensation to be paid to the defendants therefor for the taking of the said property hereinbefore mentioned for the purpose of maintaining and operating certain so called headworks for the development of the waters upon the said tracts of land, and conducting the same to the city of Los Angeles for distribution to the said city and its
1234 inhabitants. That said action was commenced by filing a complaint in the said superior court of the county of Los Angeles, and that in the said complaint it was alleged, among other things, that the Los Angeles river flowed through the city of Los Angeles, and was fed by springs which rose to the surface in or adjoining the bed of the said river, and that the bed was composed of sandy soil into which the water sinks readily and forms subterranean streams flowing in well-defined channels beneath said bed, which water rises to the surface in various places before reaching the city, and becomes a part of the surface water of said river, and that the said city of Los Angeles was, and ever since its organization has been, the owner in fee-simple of the exclusive right to the use of all of the waters of said river, from its source to the southern boundary of said city, in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, and supplying water for the irrigation of the irrigable lands embraced in the four square leagues of the public lands of the plaintiff, and for other municipal uses of the said city. That it had, prior to the commencement of the action, taken measures to inaugurate a plan and system of, and intended to construct, water works by means of which it would divert the water of the river on the lands therein described, to wit, the 314.82-acre tract, and sought to be condemned, and to conduct the same to said city for the purposes of supplying its inhabitants with water for domestic use, including the sprinkling of flower gardens and grass plots, and for the purpose of furnishing a water supply for the

sprinkling of streets and parks, flushing sewers and extinguishing fires, and for other municipal uses in said city, which plan included the acquisition of the said lands described and sought to be condemned; and that by the said system and plan so inaugurated by the plaintiff, the water of said river was to be diverted by plaintiff on the said lands by means of a submerged dam or dams,
1235 tunnels, filtration galleries, collecting chambers, settling reservoirs or basins, and other means proper and necessary for the diversion of said water on said land. That the greater part of the waters of the said river flowing on the surface therein below and to the east of said lands come into said river beneath the surface at points adjoining the northern line of said lands, and that said subterranean water flowing beneath the surface of the bed of said river on the said lands is purer and more suitable to domestic use of the inhabitants in said city than the surface water of said river.

That the population of the city was about 70,000 and was constantly increasing and the city was growing in the extent of streets, parks, sewers and buildings, so that the amount of water needed to supply the inhabitants of the city for domestic purposes including the sprinkling of flower gardens and grass plots, and to furnish water for the sprinkling of streets and parks, flushing sewers and extinguishing fires, was fast increasing to an extent that at any time in the future the whole of the water of the said river within the boundaries of the said lands sought to be condemned may be needed for said purposes; that the works would involve the expenditure of several hundred thousand dollars.

That the defendants appeared and answered the said complaint and the various amended complaints, and in that answer denied, among other things, that the Los Angeles river was fed by springs which rose to the surface in or adjoining the bed of said river, and averred that the said stream had its sources in the mountains north of the city of Los Angeles, and the river was supplied with the sources of the said stream and its tributaries, and denied that the waters of said stream sunk into the sands or that the said underground waters did form well-defined subterranean streams flowing in well-defined or any channels, beneath the bed, or that the said subterranean water flowing in said channel
1236 and beneath the said bed did rise in various or any places before reaching the city, or become part of the surface water of said river, and denied that the plaintiff was or ever was the owner in fee-simple, or had any estate, or had the exclusive or any right, to the use of all the waters of the said river from its sources to the southern boundary of the city, in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses, or supplying water for irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of the city, or for other municipal uses in said city, or for any uses or purposes whatsoever; and denied that the city had any right to the water, or right to the use of the same other than as is appurtenant to the said city as a riparian owner of lands through which the said river flowed, and rights acquired by appropriation and use thereof; and denied that

such right or use, either by appropriation or otherwise had vested in the said plaintiff, or that the plaintiff owned, the right to the use of the said waters of the Los Angeles river to the exclusion of the defendants. Averred that the defendants' lands sought to be condemned were riparian to the stream, situated above the north boundary of the city and above the point of diversion of the waters from the river by the city, and that as such owners they were entitled to the use of the waters of the river for all lawful purposes to a reasonable extent upon the said lands for irrigation, domestic and other uses, and denied that the measures taken to inaugurate a plan or system of water works by the city of Los Angeles were contemplated as the means to divert the water of the river for the purposes mentioned or any purposes. And they denied that the greater part of the water of the Los Angeles river flowing on the surface below and to the east of the lands of the defendants came into said river beneath the surface at points adjoining the northern line of said lands, and averred that there
1237 was in the said tract of land described in the complaint and sought to be condemned a vast amount of percolating water, which water was the property of the defendants and belonged to them as the owners in fee-simple of the soil, and that their said lands were of the value of $1,550,000, and that the whole current revenues of the city for three years would not be sufficient to pay the value of said lands, and that such compensation could not be made without the issuance and sale of bonds by the city to raise money for that purpose, and that no such bonds had ever been issued, nor any proceedings instituted for their issuance, and that the city of Los Angeles could not, from any funds it then had or from the current revenues of any year make payment of compensation to the defendants for the land so sought to be condemned. And further alleged that in the said lands water could be diverted by subterranean excavations to the amount of 3,000 inches measured under a four-inch pressure, and that the whole of the said waters thus percolating in the soil of the defendants, to wit, in the said tract of land described belonged to the said defendants as owners of the land. That the construction of the said works proposed by the city would collect together the percolating waters in the said soil and subtract the same from the soil and would greatly impair the value of the whole of the land by reason of such subtraction, and that it would subtract, collect, divert and conduct substantially the whole of the percolating waters in the said tract, and that the said waters would not in any manner depend upon nor be supplied by the surface flow of the said river.

And the defendants in the said answer and the amendments thereto did set up and allege the said Spanish and Mexican grants for the Ranchos Providencia, San Rafael, and the tract known as the Cahuenga, and the proceedings for the confirmation thereof, and the decrees of confirmation and the issuance of the patents thereupon, and did allege and show that their title to the said
1238 lands sought to be condemned was obtained by and through the said Spanish and Mexican grants and the United States patent as aforesaid.

And your petitioners further show that the said controversy was tried in the said superior court of the county of Los Angeles before a jury, and on the 1st day of April, 1896, the said jury rendered a verdict in which they did find that the value of an estate in fee-simple in the lands described in the complaint including all other elements of value, subject to the paramount right of the city of Los Angeles to take from the Los Angeles river from time to time all the water that might be needed at such times, for the use of the inhabitants of said city, and for all municipal and public uses and purposes therein, was the amount of $23,000.

And your petitioners further allege that they were at the time of the commencement of the said action the owners of a large tract of land and consisting of more than 1,400 acres, situated in the said ranchos, of which the 314.82-acre tract sought to be condemned was a part, and the said jury did further find that the damages accruing to the part of the lands belonging to the defendants not taken for the said headworks and water system were the sum of $2,000. That no portion of the defendants' lands would be benefitted by any diversion by plaintiff of the waters from their natural course, nor by any distribution nor delivery of water proposed to be made by the plaintiff.

And in addition to the said verdict of the jury, the said court did make findings wherein it found that the allegations of the last-amended complaint except in paragraph 3 thereof were true, and with regard to paragraph 3, that the plaintiff was and ever since its organization had been the owner in fee-simple of the paramount right to the use of all of the waters of the Los Angeles river described in said complaint, from its source to the
1239 southern boundary of said city, so far as might be needed from time to time, and in trust for the public purposes of supplying the inhabitants of said city with water for domestic uses and for supplying the water for the irrigation of the irrigable lands embraced in the four square leagues of the pueblo lands of plaintiff, and for all other municipal and public uses and purposes in said city. And did find that the allegations of the answer concerning the title to the lands of the defendants, viz: the making of the said Spanish and Mexican grants and the confirmation thereof, and the issuance of patent therefor, and the succession by the defendants to the fee-simple title of the said lands under the said grants and patents, were true, and that the said lands sought to be condemned were parts of the tract so granted by the Spanish and Mexican governments and by the said United States patent. And thereupon the court did, on the 2nd day of April, 1896, enter judgment wherein it was ordered, adjudged and decreed, among other things, that upon the payment by plaintiff to the defendants, or deposit in court for the defendants, of the moneys thereinbefore mentioned as assessed as the value of the parcels of land thereinafter described, and being the tracts hereinbefore described, and for damages accruing to the remainder of the parcels of which said lands were part, amounting in the aggregate to the sum of $25,000, within thirty days after the judgment, according to law, the plaintiff should take

the lands thereinafter particularly described, being the same hereinbefore described, for the public purposes mentioned in said complaint, and that the title in fee-simple to the said lands shall vest in and belong to the plaintiff, The City of Los Angeles, and that thereupon the said plaintiff shall become and be the owner in fee-simple of all of said lands.

And it was further ordered, adjudged and decreed that upon payment deposited in court of all of said moneys within said period of 30 days, a final judgment or decree of condemnation of
1240 said lands should be made and entered according to law.

That a motion for a new trial was made by the defendants in said action and came on to be heard before the said superior court on the 25th day of March, 1897, and on the said last-mentioned day the said motion for a new trial was denied.

That on the 27th day of May, 1896, the defendants in the said action appealed to the supreme court of the State of California from the said final judgment of condemnation given in the said cause on the 2nd day of April 1896, and on the 27th day of March 1897 they appealed to the supreme court of the State of California from the order made in the said superior court of the county of Los Angeles on the 25th day of March, 1897, denying their motion for a new trial in said cause. That the said cause was argued and submitted in the supreme court of the State of California, and on the 3rd day of June, 1899, the said supreme court of the State of California gave a judgment therein affirming the said judgment of condemnation and the order denying the new trial in said cause. That thereafter and within the time prescribed by the rules of the supreme court, to wit: within 20 days after the filing of the said judgment, the defendants filed in the said supreme court their petition presented to the said court for a rehearing in said cause, and which said petition was considered by the said supreme court of the State of California; and on the third day of July, 1899, the said petition for a rehearing was by the said supreme court of the State of California denied, and thereupon the said judgment became final, and the said judgment was the judgment of the highest tribunal in the State of California before which the said cause could be brought.

1241 That afterwards, to wit: on the 7th day of July, 1899, the said judgment of the supreme court was remitted to and filed in the said superior court of the county of Los Angeles, and thereupon, on the 10th day of July, 1899, the said complainant, The City of Los Angeles, applied to the said superior court of the county of Los Angeles for a final order of condemnation in said cause, and which application was resisted by the said defendants upon the ground that the judge before whom the said cause had been tried was disqualified to sit in the trial of said cause, he being the owner of real property in the city of Los Angeles at the time of the trial of said action and a tax-payer therein; and upon the further ground that the said payment had not been made as prescribed by law within thirty days after the giving of the said judgment of condemnation, and asked that the said proceedings be vacated and the said action dismissed. That the said superior court refused to hear

the said defendants in their opposition to the said application for the final order of condemnation, and did on the 10th day of July, 1899 make and enter a final order of condemnation in the said cause, and thereupon the defendants did on the 30th day of August, 1899, appeal to the supreme court of the State of California from the said final order of condemnation.

That the transcript of the record on the appeal from the said order has been filed in the said supreme court, and said cause has been argued and submitted to the said court, but no decision has as yet been rendered or entered upon the said appeal from the final order of condemnation, and the same is still pending in the said supreme court of the State of California.

And your petitioners further allege that upon the trial of the said cause, and upon the appeal from the judgment given in the superior court, to the supreme court of the State of California, the defendants did claim that by virtue of the said Spanish and Mexican grants of the said Providencia and San Rafael ranchos, and the tract
1242 known as Cahuenga, and the confirmation thereof and the patents issued by the United States to their predecessors in estate, they, the said defendants, were, as the owners in fee-simple of said lands sought to be condemned, and under the title aforesaid, entitled to the use of the waters of the Los Angeles river upon their said lands for agricultural and domestic uses, and of all rights in the waters of the Los Angeles river appertaining and belonging to riparian owners, and the decision of the said superior court of the county of Los Angeles, and of the supreme court of the State of California affirming the said decision was against the right thus claimed.

And your petitioners further show that it was alleged and proved, and was not controverted, that the Los Angeles river had its sources in the mountain ranges above the tracts of land sought to be condemned—the property of the said defendants—and flows in a southerly direction to, upon, and through the said lands of the said defendants, the subject of this controversy, and continues on in its course southeasterly and southerly through divers other tracts of land and to the north boundary of the city of Los Angeles, and flows down through the said city in a southerly direction and towards the Pacific ocean.

That there was no controversy concerning the facts of the rise and flow of the Los Angeles river and of its flow through the said lands of the said defendants, the same sought to be condemned, before reaching the said city of Los Angeles.

And it was decided by the said supreme court of the State of California that the defendants' claim to any rights in the Los Angeles river, except subject to a paramount absolute right of the said city of Los Angeles to all of the waters of the said stream for the use of itself and its inhabitants, was invalid.

And your petitioners further show that the said jury before whom the cause was tried were so instructed by the said superior
1243 court, and were instructed that the valuation of the said property, or the compensation to be paid to the defendants there-

for, should be ascertained and determined upon the principle there announced by the said court, to wit: that the defendants, owners of the said land, had no rights to the use of the said waters as riparian owners or otherwise, save only subordinate to the paramount right of the said city of Los Angeles.

Your petitioners further show that the said lands of the said defendants were of great value for agricultural purposes if they were entitled to the use of the waters of the said Los Angeles river for irrigation, and domestic purposes to the extent which such riparian owners have been by the supreme court of the State of California adjudged to have in the said stream, and that the value of their said lands would be and was depreciated by at least one-half, upon the rule of law in the said cause announced in the instructions to the jury, and affirmed by the decision of the supreme court of the State of California.

And your petitioners allege that by reason of the said decision and the verdict of the jury given thereunder, and in accordance therewith, the amount of damages or the compensation to be paid to the defendants awarded by the said jury for the taking of the said property, to wit: $23,000, was not the fair or just or actual value of the said property, and that by the said judgment, the property of the said defendants was taken without due process of law, in violation of the 14th amendment to the Constitution of the United States.

And your petitioners further allege that the said decision impaired the obligation of the contract contained in the said Spanish and Mexican grants, confirmed by the United States, and in the patents issued to the defendants' predecessors for the said lands, in violation of section 10, article 1 of the Constitution of the United States,
1244 and is in violation of article 8 of the treaty of peace between the United States and the Republic of Mexico exchanged at Queritero May 30th, 1848.

Your petitioners further show that upon the trial of the said cause, it was proven and admitted by both parties that the incorporation boundaries of the city of Los Angeles had been extended since the issuance of the patent of the United States to the mayor and common council of the city of Los Angeles hereinbefore mentioned and referred to, at divers times, and that the area now included within the limits of the said municipal corporation known as the city of Los Angeles was about fifty per cent. greater than the lands so conveyed by the said patent, and originally constituting the city of Los Angeles. And that since the date of the issuance of the said patent, a number of parks had been dedicated and laid out; that the aggregate area included within the said parks amounted to 700 or 800 acres. That in three of the said parks, lakes of considerable size were maintained, boat-houses were kept thereon, and row and sail boats kept for the amusement and pleasure of the visitors to said parks. That the said parks were highly cultivated, maintained extensive lawns, trees, shrubs and flowers of all kinds, and that the waters for supplying the said lakes and maintaining the said parks were obtained from the waters of the Los Angeles river, and that the sections which had been added to the territorial limits of

the city were in great part thickly settled and inhabited, and a large proportion of the inhabitants of the city of Los Angeles dwelt therein. That public school-houses and fire-hydrants were maintained in the said added portions of the city, a large number of streets had been laid out and graded and were constantly sprinkled, and that the water for the said inhabitants and the maintenance of their yards, gardens and shrubbery, and water for sprinkling the said streets was all obtained from the Los Angeles river, and not from any other source. And the said lands which
1245 were so added to the said boundaries, except a small portion thereof, were never riparian to the said Los Angeles river. And the defendants claimed that whatever paramount rights the said city of Los Angeles, as the successor of the pueblo of Los Angeles, had to the use of the waters of the river of Los Angeles (if any) were confined to the territorial limits of the said pueblo lands, and they, as the owners of the said tract of land sought to be condemned, part of the ranchos aforesaid, claimed that by virtue of the said Spanish and Mexican grants and the said United States patents, they were entitled to the prior and paramount right to the use of the waters of the said Los Angeles river as against the inhabitants of the said lands which had been incorporated within the said city of Los Angeles in addition to the said pueblo lands, and that the said city of Los Angeles had not any paramount right or rights at all as against these defendants to the use of the waters of the Los Angeles river for maintaining the said lakes, and irrigating the said lands outside of the pueblo limits and outside of the lands patented to the said city of Los Angeles, and the decision of the said superior court of the county of Los Angeles was against the claim thus made by these defendants, and the said jury were by the said superior court instructed that the city of Los Angeles not only had this paramount right to the use of all the waters of the river for its own purposes, but that it had that right to supply every portion of the city of Los Angeles, as well that outside of the patent limits of said city as within the said patent boundaries, and to supply all of the purposes to which the city was applying the said water, including the maintenance of lakes for the mere pleasure of the people and for sprinkling streets in the lands which were no part of the pueblo lands, and in lands which were never riparian to the said stream, nor had any rights to the use of the said water. But that the paramount right of the said city of Los Angeles extended to every purpose and
1246 every use to which it chose to apply it, and to the full extent of the territorial limits of the said city, and that any rights of the defendants in the waters of the Los Angeles river for use upon their lands for any purpose were subordinate to this paramount right of the city as thus defined. And the said decision of the superior court of the county of Los Angeles was affirmed by said supreme court of the State of California, and the said supreme court of California did decide that the claims of the defendants last aforesaid were invalid and that they had not the rights thus claimed.

Your petitioners further allege that upon the trial of the said cause, it was proven without contradiction and by the testimony of

the witnesses both for the plaintiff and the defendants, that the San Fernando basin in which the said ranchos hereinbefore described are situated, is surrounded by mountain ranges, and that the mountain watershed has an extent of something more than four hundred square miles; that these mountains rise abruptly from the plain on all sides of the said San Fernando basin, except the comparatively narrow space which approaches the city of Los Angeles. That the rains which fall upon the mountain ranges quickly descend the sides of the mountain and pour into the San Fernando plain, which at the upper or northern portion thereof is about 20 miles in width and grows wider till the width of the basin becomes about twenty-five or thirty miles; then it gradually narrows until as it approaches the lands in controversy in this cause, the valley is about two and a half miles in width, and extends down through the Cahuenga range on the southwest and the Verdugo range on the northeastern sides, of practically about that width, until it reaches the plains upon which is situated the city of Los Angeles. That there are three principal tributaries furnishing the water of the Los Angeles river, viz: the Verdugo creek, the Big Tejunga and the Little Tejunga. That the Verdugo stream is several miles below the lands in controversy. That the
1247 Big Tejunga and Little Tejunga come into the stream either upon or a little ways above the lands of the defendants and here sought to be condemned. That the waters of the Tejungas both disappear some distance above the Los Angeles river. That the waters which pour upon the plains of the San Fernando basin do for the most part disappear in the sandy gravel, boulders, and loose material of which it is composed. That the Los Angeles river makes its rise some five or six miles above the lands of the defendants and increases in volume until at the point where it enters the lands of the defendants on the western or northwestern side, the volume is a little over a thousand inches, measured under a four-inch pressure. That it goes on increasing in volume until at the point where it leaves the said tract of land, at the easterly or southeasterly end, the amount of the said stream is about twenty-three hundred inches measured under a four-inch pressure. That it continues to increase in volume until when it reaches the city of Los Angeles, the aggregate amount is approximately four thousand inches. That all through the San Fernando basin, wherever borings were made (and the borings extended over nearly the whole thereof) waters are found underneath the soil making their way through the soil in accordance with the general inclination of the surface and upon the tract of land owned by the defendants and sought to be condemned, and across its entire width of about two miles and a half the underground waters are so found moving through sand and gravel, and other porous and loose material underlying the surface of the soil, and in a southerly or southeasterly direction. And while the evidence varied quite considerably as to the amount of these underground waters thus moving through the lands of the defendants, it was shown that there was a very large amount of such waters, not less than about six thousand inches, at the lowest estimate, and something over nineteen thousand at the largest esti-

mate. And evidence was introduced tending to prove that
1248 these waters which were found in these depths, ranging from 60 to 120 feet would supply through the underground system of works a quantity of water amounting to from 2,000 to 3,000 inches measured under a four-inch pressure, and of a value of not less than $500 an inch, and this without affecting the surface flow of the river. And the defendants claimed that as the owners of the land in fee-simple, they were the owners of the waters thus percolating through the soil. That under and by virtue of the said Spanish and Mexican grants, and of the said U. S. patents, and as incident to the title conveyed by them, and under the laws of the United States, the title to the said underground or percolating waters was vested in the said defendants, and that they had the right to develop, divert and use it for their own purposes, and the decision of the said superior court and affirmed by the supreme court of the State of California was against the said claim and the rights thus set up, and the jury were instructed by the said superior court, in substance, that the city of Los Angeles was the owner of those waters as a part and parcel of the Los Angeles river, and in the verdict of the jury, the value of the said waters was not considered at all, nor was any compensation made to the defendants therefor, and the defendants allege that their said property was taken for a public use without any just compensation and without due process of law, and in violation of the fourteenth amendment to the Constitution of the United States, and that the said decisions impaired the obligations of the contract as hereinbefore mentioned, and were in violation of the said constitution, and that the said decision was in violation of the treaty aforesaid for the protection of the said property.

And your petitioners further allege that the claims of the said defendants appeared upon the facts alleged in the said answer, and in the instructions asked by the defendants, and in those
1249 given by the court, and the claims of the said defendants were necessarily involved and decided therein, and the decision was against the claims made by the said defendants and the rights set up by them and claimed under the Constitution and laws of the United States and the Spanish and Mexican grants and the treaty aforesaid.

Your petitioners further show that the legislature of the State of California passed an act in the year 1872 entitled, "An act to establish a code of civil procedure." That by part 3, title 7, sections 1237–1263 of the said Code of Civil Procedure, provision is made for the exercise of eminent domain. It declares the purposes for which it may be exercised, prescribed the proceedings for the condemnation of private property for a public use, and provides for the issuance of a summons, after the filing of a complaint, and which summons, among other things, contains a notice to the defendant to appear and show cause why the property described should not be condemned as prayed for in the complaint, and declares, among other things, in section 1249 that for the purpose of assessing compensation and damages, the right thereto shall be deemed to have

accrued at the date of the summons, and its actual value at that date shall be the measure of compensation for all property to be actually taken, and the basis of damages to property not actually taken, but injuriously affected, in all cases where such damages are allowed as provided in section 1248 and that if an order be made letting the plaintiff in possession as provided in section 1254, the compensation and damages awarded shall draw lawful interest from the date of such order. No improvements put upon the property subsequent to the date of the service of the summons shall be included in the assessment of compensation or damages.

Your petitioners further show that the summons in this case was issued on the 27th day of June, 1893, and was served on one
1250 of the defendants, J. D. Hooker, on the 7th day of June, 1894, and on the other defendant, A. E. Pomeroy, on the 8th day of June, 1894.

That on the trial of this cause, the defendants claimed that they were entitled to the actual value of the property as the compensation for the property taken, to wit: the 314.82-acre tract. The plaintiff claimed that the compensation to be paid for the property taken was its market value as of June 27, 1893, and in the trial evidence was introduced by the plaintiff for the purpose of showing that at that date, to wit: June 27, 1893, the date when the summons was issued, that very little was known about the quantity of the underground waters percolating through the lands of the defendants, and that as there was no knowledge thereof, the existence of the waters, whatever value they might possess, could not and did not affect its market value, and should not be considered for that reason, and the court instructed the jury that for the purpose of assessing the compensation for the property taken and the damages to the other part, the right was deemed to have accrued at the date of the summons, which was June 27, 1893. And they were further instructed that although they might believe from the evidence that by reason of things done, discovered or ascertained since June 27, 1893, it now appears that the land was then more valuable for any purpose or use than it was then known to be, yet they could not consider such additional value unless they believed also that these things were sufficiently known or obvious in June 1893 to affect the market value at that time, and did so affect it. And that if they found that any of the underground waters of the land sought to be condemned were not a part of the waters of the Los Angeles river, they could consider that fact in fixing compensation only so far as it tended, if at all, to affect the actual market value of the land at the date of issuing the summons, disregarding any acts done upon the lands, or information acquired concerning said waters since said date,
1251 and that they were entitled to consider the evidence regarding the quantity of subterranean waters in the lands in question and their value only in arriving at a just determination of the market value of the lands sought to be condemned, on the 27th day of June, 1893, and that, therefore, if they believed that the said waters did not give such lands an additional market value at that date, or that if an additional market value were given, but the

same did not equal the real value of said waters, then they must place on said land a valuation equal only to the market value which they then had, including the additional market value which said waters gave to said lands, irrespective of the true value of said waters.

And your petitioners further show that throughout the said instructions, the jury were instructed not to give the actual or true value of the lands, either at the date of the summons or the service of the summons, but they were to give the market value, and that if for the want of information of the existence and extent of the waters percolating therein at that time, the market value was not increased, that they were only to give such market value though believed by them to be much less than its real, true or actual value.

Your petitioners further allege that the decision of the said superior court was affirmed by the supreme court of the State of California, and that that court did decide against the claim of the defendants that they were entitled to the just, true and actual value of their property, and the petitioners allege that the said decision was in violation of the provisions of the fourteenth amendment to the Constitution of the United States.

And your petitioners further show that the statute of the State of California, part of the Code of Civil Procedure aforesaid and hereinbefore set forth, though it did in terms provide that to measure the compensation, the actual value should be taken, yet by
1252 the decision of the supreme court of the State of California in this cause, the said statute has been determined to mean that it is the market value, although such market value should be less than the actual value.

And your petitioners allege that under the said interpretation, the said provision of the Code of Civil Procedure of the State of California is in violation of the fourteenth amendment to the Constitution of the United States, and does authorize or attempt to authorize the taking of private property for a public use without making just compensation, and that the claim of the city of Los Angeles in the said cause that it was, under the said statute, authorized and entitled to take the said property without making just compensation, in violation of the said fourteenth amendment of the Constitution of the United States was sustained, and that there was in the said action drawn in question the validity of the statute of the State of California on the ground that it was repugnant to the Constitution of the United States, and the decision was in favor of the validity thereof.

1253 And your petitioners allege and show that in all the matters hereinbefore set forth, the decision of the said supreme court of the State of California in this cause was against the title and rights claimed by the said defendants in this cause under the Constitution of the United States and the treaty with Mexico aforesaid, and the decision was in favor of the validity of said statute of the State of Calfornia, though in contravention of and repugnant to the Constitution of the United States and of the rights guaranteed by the said treaty.

Your petitioners further allege that in the said complaint filed by the said city of Los Angeles in the said superior court of the county of Los Angeles for the condemnation of the said property, the said city alleged and claimed that the said waters percolating in the said lands so belonging to your petitioners, the defendants in the said suit, and which were part of the said lands, were in fact the property of the city of Los Angeles, the said city asserting and claiming that the said percolating waters constituted the Los Angeles river, and that the said city was the absolute owner of the said waters, which said claims on the part of the city were denied by the said defendants, and the said defendants set up their rights to and claims to be the owners of the said waters. And the said defendants alleged that as the owners of the said lands, they were also the owners of all of the waters percolating in the soil thereof, and upon the issues being made between the said parties upon the title to the said property, the defendants moved the said superior court on the 24th day of February, 1896, to stay the proceedings in the action for a condemnation of the said property until the rights of the parties in the land sought to be condemned and in the waters of the Los Angeles river and the waters flowing beneath the surface along the lands of these defendants, and in the waters percolating in the soil of said lands, had been finally determined by a court of competent
1254 jurisdiction, and that such rights should be determined, before a jury could properly estimate and determine the compensation to be paid to the defendants for the taking of the said property, and also upon the further ground that there was then pending in the said superior court of the county of Los Angeles another suit brought by the said City of Los Angeles wherein it claimed the title to a certain water ditch connecting with the said Los Angeles river upon the lands of the defendants, and the right to divert water therethrough, and to conduct the same to the city of Los Angeles, for the purpose of supplying its inhabitants with water, and the municipality with water for municipal purposes, and that in the complaint in the said suit so referred to, it was among other things, alleged that the said city had, through its officers and agents, continually from the foundation of the pueblo in 1786 appropriated and used all the waters of said river, including its springs and sources and percolating, waters, and had taken the same out by a system of dams and ditches and canals, and distributed the same among its inhabitants, and prayed judgment against the defendants, enjoining them and their agents from interfering with the said dam, ditch or waters flowing therein, or preventing the waters of the river from flowing into the ditch. And in the said suit, the defendants had appeared and answered said complaint and denied the title of the city to the said ditch, or to the said waters, or the right to maintain the ditch upon the lands of the defendants, or to divert the waters of the river therethrough, and denied its title to said waters, as alleged, and which said suit was still pending and undetermined.

And the said defendants did upon the said motion insist that the court had no jurisdiction to combine an action to quiet title to prop-

erty, and to seek its condemnation at the same time, and no authority to proceed to trial before a jury for the purpose of determining the compensation to be paid for the taking of property, while
1255 at the same time litigating the question of the property which was to be condemned, but which said motion was denied, and the defendants were compelled to proceed with the trial before the jury as to the compensation to be paid for the property to be taken, while the property which was to be taken was yet undetermined and unascertained, and was not determined nor ascertained, nor were any findings of the court filed until after the verdict of the jury was rendered, and the jury were in fact left to determine what property was owned by the defendants, what rights they possessed therein, and what right, title, interest or estate the city of Los Angeles had therein, and then to fix the compensation to be paid therefor upon the property which the jury in their minds might conclude was the property of the defendants, and the estate, right, title and interest which they held therein, without any means of the defendants ever knowing what the jury did consider the property of the defendants which they were to value, or the compensation for the taking of which they were to establish.

And your petitioners allege that the said order denying their motion to stay the proceedings and in compelling the defendants to proceed with the trial for the purposes of determining the compensation to be paid for taking the property for a public use, before the property which was to be taken was ascertained, or the defendants could be heard in the manner prescribed by the law of the land as to their right, title and interest in the said property, was in violation of the Constitution of the United States and resulted in the taking of their property without just compensation, and the said proceedings denied to the said defendants in the said controversy the equal protection of the law, in violation of the fourteenth amendment to the Constitution of the United States.

Your petitioners further show that upon the trial of the
1256 said cause and for the purpose of sustaining the claim of the city to the ownership of the said waters, as alleged in the complaint, the said city offered in evidence certain statutes of the State of California, to each and all of which the defendants objected upon the ground that they were incompetent, irrelevant and immaterial, and that the acts themselves were unconstitutional, and that notwithstanding such objection the said statutes were admitted in evidence.

That the first of the said statutes so offered in evidence was the act to incorporate the city of Los Angeles, passed April 4, 1850, by which said act, all that tract of land situated within the limits of the Pueblo de Los Angeles, as theretofore known and acknowledged, should thenceforth be known as the city of Los Angeles, and the said city was thereby declared to be incorporated according to the provisions of the act entitled, "An act to provide for the incorporation of cities, approved March 18, 1850" and provided that if such limits included more than four square miles, the council should within three months after they were elected and qualified, fix by

ordinance the limits of the city not to include more than said quantity of land, and the boundaries so determined should thenceforth be the boundaries of the city.

And it was further provided that the corporation created by that act should succeed to all the rights, claims and powers of the Pueblo de Los Angeles in regard to property and should be subject to all liabilities incurred and obligations created by the ayuntamiento of said pueblo.

The next of the said acts introduced in evidence over the objection of the defendants was the "Act supplementary to an act to incorporate the city of Los Angeles, passed April 4, 1852, and approved May 1st, 1852," which act provided that the act to provide for the incorporation of cities passed March 11, 1850 should be observed,
and the change of boundaries aforesaid, except that the lim-
1257 itation of four square miles should not apply to the city of
Los Angeles, and that the common council should have the power, and it was made their duty to pass ordinances providing for the proper distribution of water for irrigating the city streets.

There was also an act introduced entitled "An act explanatory of an act entitled, An act to incorporate the city of Los Angeles, approved April 4, 1850, passed April 13, 1854," which, after providing for the office of superintendent of irrigation for the county of Los Angeles, and a system of regulations for the control of streams and the distribution of water for that purpose, also provided that nothing contained in the act should be construed as applying to the city of Los Angeles or to the waters of the Los Angeles river, which were thereby especially exempted from its operation, by which explanatory act it was declared that the third section of the act entitled, An act to incorporate the city of Los Angeles, approved April 4, 1850, should be construed to vest, and to have vested in the mayor and common council of said city the same power and control over the distribution of water for the purpose of irrigation or otherwise among the vineyards, planting grounds and lands within the limits claimed by the ancient Pueblo and Ayuntamiento de Los Angeles, and by said mayor and common council as the ejidos or commons of said city, the possession whereof was declared to be in the said mayor and common council.

Also, "An act to promote irrigation in the county of Los Angeles," approved March 10, 1874.

And there was also introduced "An act to amend the charter of the city of Los Angeles, to define its limits and rights, enlarge its powers, and provide for its more efficient government," approved March 26, 1874, by which act it was provided that there should be and thereby was granted to the said city of Los Angeles to be by
it held, used and enjoyed in absolute ownership, the full,
1258 free and exclusive right to all of the waters flowing in the river
of Los Angeles at any point from its source or sources to the intersection of said river with the southern boundary of said city; also the right to develop, economize, use and utilize all the waters flowing beneath the surface in the bed of said river, at any point or points between the points of terminii above given, and for that pur-

pose it was thereby declared that the powers to condemn property outside of the limits of said city, given by the provisions of section 2, article 2 of the act, in so far as the same relate to the condemnation of property for increasing the water supply of said city are intended to be given and to be restricted to such sources of supply and to the rights therein, excepting and reserving from the operation of the aforesaid grant of the water flowing in said river, unless the same be condemned and taken for public use, all vested private rights to the water flowing upon the surface or beneath it in the bed of said river.

Also "An act to revise an act, entitled An act to amend the charter of the city of Los Angeles, to define its limits and rights, enlarge its powers, and provide for its more efficient government" passed March 26, 1874, approved April 1st, 1876, by which said act of April 1st, 1876, in section 1, article 2, there was the like grant as was contained in the act of 1874, to the city of Los Angeles, of the water flowing in the river of Los Angeles, and with the same provision excepting therefrom all vested private rights to the waters flowing upon the surface or beneath it in the bed of said river.

There was also introduced an act of the legislature of the State of California approved March 30, 1878, amending the act of April 1st, 1876 last referred to, and by the provisions of section 1, article 2 of the said act of March 30, 1878, the legislature provided and declared

1259 that there was thereby granted to the said corporation to be by the same held and enjoyed in absolute ownership, the full, free and exclusive right to all the waters flowing in the river of Los Angeles at any point from its source or sources to the intersection of said river with the said boundary of said city; also the right to develop, economize, use and utilize all waters flowing beneath the surface in the bed of said river at any point or points between the points of terminii above given. And for that purpose it was thereby declared that the powers to condemn property outside of the limits of said city existed, and further provided that the said corporation should not in any manner dispose of, transfer, or convey any portion of said water or any right to develop or use the same, or any portion thereof, to any corporation, association, individual or other person who might or would use the same in any way prejudicial to the use thereof for irrigation, domestic and culinary purposes within the limits of said city, or who might or would at any time for any good or valuable consideration, desire to sell or in any way dispose of to any person, actual or artificial, any interest therein, or the right to the use thereof, and with the general power of control and distribution of the said waters. And the said act did not contain any provision excepting any rights, public or private from the operation of the said act, but affected to grant to the said city of Los Angeles the absolute ownership of the waters of the Los Angeles river as therein set forth.

There was also introduced a joint resolution of the senate and assembly, of the State of California, approving the charter of the city of Los Angeles, adopted by the people under the provisions of the constitution of 1879, and which said joint resolution was passed

the 31st day of January, 1889, by which said charter so adopted and ratified and approved by the legislature, it was provided that the city of Los Angeles should continue in the ownership and enjoyment of all rights to the water of the river of Los Angeles
1260 theretofore vested in it, its predecessors or predecessors, including the pueblo of Los Angeles, and was thereby declared to have the full, free and exclusive right to all the water flowing in the said river at any point from its source or sources to the intersection of said river with the southern boundary of said city, and also the ownership of and the right to develop, economize, control, use and utilize all waters flowing beneath the surface of the bed of said river at any point or points between the points of terminii above named, and with the like provision against the conveyance and other disposition of the said property by the said corporation to any corporation or person, of the right or privilege to use, manage or control the same, except by a license revocable by the said city at its pleasure upon notice not to exceed six months.

That each and all of the said acts of the legislature and the said charter provisions were admitted in evidence in this cause, against the objection of the said defendants.

And your petitioners allege that the said statutes of California, in so far as they attempt to grant to the city of Los Angeles the waters of the said stream as therein provided, were and are unconstitutional, and were in violation of the contracts made by the Spanish and Mexican government- by the grants aforesaid and of the contract contained in the patent of the United States issued for the said Providencia and San Rafael ranchos, and the tract known as the Cahuenga, and did thereby impair the obligation of the said contracts, and were in violation of the Constitution of the United States, and though in the admission of the said evidence by the said superior court, it was stated by the judge of said court that they were admitted only for the purpose of showing the transfer of the pueblo rights to the city of Los Angeles, yet your petitioners allege that they were invalid and inadmissible for that purpose, and that the said acts undertook to define and establish the rights of the
1261 pueblo and to transmit the same by act of the legislature of the State of California as so defined by the said legislature, and that the said acts attempted to and were intended to deprive your petitioners of their property in the waters of the Los Angeles river and in the percolating waters in the said San Fernando valley without due process of law, and were parts of the evidence upon which the judgment of condemnation was based, and the same was affirmed by the supreme court of the State of California.

And your petitioners further show that the said cause was twice argued before the said supreme court of the State of California. That it was first heard and argued at the October term of said court in the year 1898 at the city of Los Angeles in the State of California, and was submitted to the court upon the said oral arguments and briefs which had been theretofore filed by the respective parties in the said court, and that in the month of August, 1898, the submission was set aside and the cause ordered to be re-argued, and in the

October term of 1898, the cause was re-argued before the said supreme court of the State of California, and again submitted upon the said oral arguments of the respective parties and the briefs filed, and was, as hereinbefore alleged, decided by the supreme court on the 3rd day of June, 1899. And that by the laws of the State of California, the opinions of the said supreme court of the State are required to be in writing, and the said opinion in this cause was in writing and filed with the clerk of said court.

And your petitioners show that in the said record and proceedings in the said supreme court, and also in the rendition of its said judgment, a manifest error has happened, to their great damage, and that according to the laws of California and the practice in the courts of the said State, on taking the appeal to the said supreme court, a full transcript of the pleadings, evidence and proceedings had in said suit in said superior court was filed

1262 in the said supreme court, and there remains on file and of record with said final judgment. And by said pleadings, findings and evidence, and the opinion of the said supreme court, it does appear that the said judgment of the said supreme court will deprive your petitioners of their property without due process of law, and will impair the obligation of the contract under which the title to their property is held, and that they have been denied the equal protection of the laws. And that it does appear by the said opinion of the said supreme court that that court held and decided that notwithstanding your petitioners were the owners in fee-simple of the said tract of land, and that they had acquired the same by and through the said Spanish and Mexican grants, and the patents issued by the United States aforesaid, they were not entitled to the waters percolating in the soil of the said lands so owned by them in fee-simple, and that notwithstanding the Los Angeles river flowed through the said lands in its natural course, they were not entitled to a reasonable use of the said waters as such riparian owners, except in subordination to a paramount right of the city of Los Angeles to consume the whole for its own purposes, and that notwithstanding their said title had accrued at the times and in the manner hereinbefore set forth, the said city of Los Angeles was not only entitled to the paramount rights aforesaid for the supply of the inhabitants of the city residing within, and for other uses within the limits of the said pueblo lands as patented by the United States Government, but that the said paramount right and use of the said city extended to its extreme boundaries and to lands acquired subsequently to the accruing of the rights of these defendants and their predecessors, and upon lands which were never riparian to the stream nor had any other right, title or interest in the waters of the said river, and that said paramount rights of the said city existed not only for the purpose of supplying its inhabitants

1263 with water for all needful and valuable uses, and the city with water for municipal purposes, but that it extended to any and every use which said city saw fit to make of the same, though devoted merely to ministering to the pleasure of the inhabitants and of all within the limits of the city, for the purpose of

maintaining lakes and parks, as hereinbefore stated, and that the rights of your petitioners in or to the waters of the Los Angeles river were subordinate to all of such uses by the said city of Los Angeles.

And it further appears therefrom that in determining the amount of compensation to be paid for the taking of the said property, that that decision was reached by excluding from the said lands and from the ownership thereof by your petitioners any rights in or to the said percolating waters, or any rights in the surface flow of the stream, other than as subordinate to the said paramount right of the city to take the whole of the said stream for said uses, and the development of said percolating waters, and abstracting the same for its own use.

And it further appears therefrom that the said supreme court did decide that the statutes of the State of California purporting to grant the said rights to the whole of the said waters were good and valid, and did operate to transfer the said rights, claiming that the same proceeded from the State of California as the successor to the pueblo rights of the pueblo of Los Angeles, under the Spanish and Mexican laws; and further decided that the said statute of the State of California prescribing the measure of compensation to be made as the actual value of the property at the particular time therein mentioned as hereinbefore set forth, did mean the market value, and that said statute as so interpreted was valid and authorized the taking of the defendants' property upon the payment, not of its actual value, nor just compensation, but its market value as determined by the knowledge and opinion of the public concerning the said property, and of its elements of value, at the par-
1264 ticular time hereinbefore stated and set forth in the said instructions.

And therefrom it does further appear that it was decided that your petitioners could be required to litigate before a jury in a proceeding for the taking of their property for a public use, their title to the said property, and the extent of their interest therein, and that the said jury could by some process, unknown to your petitioners or any one else, arrive at some conclusion equally unknown to your petitioners or any one else, as to what was the property of these defendants, and what the extent of their estate therein, and proceed to estimate and determine the market value of such right, title or interest so concluded by them to be in your petitioners, and that your petitioners would not know and could not know upon what property or what estate therein the said valuation was made.

And your petitioners allege that by the said decision the property of your petitioners was taken for a public use without just compensation, and they were deprived of their property without due process of law, and were denied the equal protection of the laws, and that the said decision impaired the obligation of the contracts aforesaid, and was contrary to the provisions of the Constitution of the United States hereinbefore referred to.

Wherefore, your petitioners pray for the allowance of the writ of error herewith presented from the Supreme Court of the United

States to the supreme court of the State of California, and such other process as will enable your petitioners to obtain a review of said cause of The City of Los Angeles *vs.* John D. Hooker and A. E. Pomeroy, and the correction of the errors aforesaid, and herein alleged to have been committed by said supreme court of California, and for such other and further order as may be proper, and your petitioners will ever pray.

R. H. F. VARIER,
JOHN G. NORTH, AND
J. S. CHAPMAN,
*Attorneys for the Defendants, Pomeroy and Hooker.*

JOHN GARBER, *Of Counsel.*

1265 Writ of error allowed this 24th day of June, 1901.

W. H. BEATTY,
*Chief Justice of the Supreme Court of Calif.*

1266 [Endorsed:] Copy L. A. 419--In the supreme court of the State of California. City of Los Angeles, plaintiff, *vs.* John D. Hooker and A. E. Pomeroy, defendants. In the matter of the petition of John D. Hooker and A. E. Pomeroy, for a writ of error. Assignment of errors. Filed June 27, 1901. Geo. W. Root clerk A. W. Johnson chief deputy. J. S. Chapman, attorney-at-law, rooms 100-'3 Potomac block, Los Angeles, California.

1267 Copy.

UNITED STATES OF AMERICA:

In the Supreme Court of the State of California.

CITY OF LOS ANGELES, Defendant in Error,
*vs.*
JOHN D. HOOKER and A. E. POMEROY, Plaintiffs in Error.

*Assignment of Errors.*

John D. Hooker and A. E. Pomeroy having petitioned the above-named court for an order permitting them to prosecute a writ of error to the honorable, the Supreme Court of the United States from the final judgment made and entered in said cause by the supreme court of the State of California, now make and file the following and specifies the same as their assignment of errors herein upon which they will rely for reversal of said judgment upon said writ:

I.

That by the record herein it appears that the supreme court of the State of California erred in holding that the said defendants in the said action brought by the City of Los Angeles against the said John D. Hooker and A. E. Pomeroy for the condemnation of the property involved herein, did not own and were not entitled to the waters percolating in the lands belonging to them.

II.

1268 That the said supreme court of the State of California erred in holding that the said defendants though owners in fee-simple of the said lands and through which the Los Angeles river flows in its natural course, were not entitled to the use of the waters of said stream for domestic purposes, and to the reasonable use thereof for irrigation and all other lawful purposes except in subordination to the paramount right of the city of Los Angeles to take the whole of the said waters for the purpose of supplying itself and its inhabitants with water.

III.

That the said supreme court of the State of California erred in deciding that the city of Los Angeles was the owner of the waters of the said Los Angeles river or entitled to the use thereof, and that such ownership or right was paramount to the rights of the said defendants in said suit, plaintiffs in error.

IV.

The said supreme court of the State of California erred in deciding that the said city of Los Angeles owned or was entitled to the paramount right to take the said water and to use the same for distribution to the inhabitants of the city of Los Angeles, and for supplying municipal wants in the territory within the said municipal corporation of the city of Los Angeles, or outside of the limits of the pueblo and outside of the lands patented by the United States Government, or that the said city was entitled to the paramount use of said water for any purposes in the said territory outside of said patented limits.

V.

The supreme court of the State of California erred in deciding that the said city of Los Angeles had the right as against these defendants to take the waters of the Los Angeles river or to distribute or use the same in the said lands outside of the patented limits of the city for any purposes whatsoever.

VI.

1269 The supreme court of the State of California erred in deciding that the said city of Los Angeles did by virtue of succession by said city to the pueblo rights of the pueblo of Los Angeles or was for any other reason entitled as against the said defendants, plaintiffs in error, to the right to take the waters of the Los Angeles river and to use the same for the maintenance of the public parks of the city and of lakes therein kept and maintained for the pleasure of the inhabitants for boating and fishing purposes, and that such right was paramount to the rights of the said defendants, the plaintiffs in error.

VII.

The said supreme court of the State of California erred in deciding that the claim of the said defendants in said action to the ownership of the waters percolating in the said land so belonging to them in fee-simple under the said Mexican grants and the United States patents was invalid.

VIII.

The said court erred in deciding that the said defendants in said action had no rights in the waters of the Los Angeles river except in subordination to the said paramount right of the city of Los Angeles to take the whole of the said water for the use and purposes of supplying the inhabitants of the said city, or any portion thereof, with water, or in supplying the municipal uses of said city, or in maintaining the said public parks and the lakes therein for the purposes aforesaid.

IX.

The said court erred in deciding that the defendants were not entitled to the value of their said lands including the waters percolating therein and part and parcel thereof.

X.

The said court erred in deciding that the city of Los Angeles was entitled to take the said lands, the property of the said defendants in said action for the public uses aforesaid without making
1270 any compensation for the value which the said land possessed for the waters percolating therein.

XI.

The said court erred in deciding that the said city of Los Angeles was entitled to take the said lands of the defendants in said action for the said public uses without making compensation for the value of the said land with the rights of a riparian owner included therein, and in deciding that the owners of the said lands were not entitled to such riparian rights.

XII.

The said court erred in deciding that the said city of Los Angeles was entitled to take the said lands for the said public uses by making payment of the sum determined by the jury to be the market value of the said lands at the date of the issuance of the summons.

XIII.

The said court erred in deciding that the said city of Los Angeles was entitled to take the said lands and to make compensation therefor not according to its actual value, but according to the value which it possessed in the public mind by reason of the knowledge of the public concerning the various elements of its value.

XIV.

The said court erred in deciding that the statute of the State of California which assumed to authorize the taking of the said property without paying its actual value or just compensation, was valid.

XV.

The said supreme court of California erred in deciding that the defendants in said action, plaintiffs in error, were not entitled under and by the 14th amendment of the Constitution of the United States to just compensation as a condition to the taking of their property for the public use.

1271

XVI.

The said court erred in deciding that in the proceeding to condemn the property of the said defendants, plaintiffs in error, they, the said defendants, plaintiffs in error, could be compelled to litigate with the said city of Los Angeles the claims of the said city to the ownership of the waters of the Los Angeles river and the waters percolating in the lands of these defendants, and that the jury could be permitted to determine in their own minds the estate of the defendants and the extent of their interests in the said lands and waters, and to determine the compensation to be paid for such estate or interest as they might thus believe the defendants were the owners of, or were entitled to.

XVII.

The said court erred in deciding that the statutes of the State of California purporting to authorize or attempting to clothe the jury with the power in condemnation proceedings to determine both the property to be condemned and the right, title, interest and estate of the defendants therein, and also to determine the compensation to be paid therefor, were valid.

XVIII.

The said supreme court of the State of California erred in upholding the validity of the authority exercised by the said superior court in taking the property of the said defendants, plaintiffs in error, in the manner aforesaid, and in not deciding that the said proceedings were repugnant to the 14th amendment to the Constitution of the United States and void.

XIX.

The said court erred in deciding that the property of the defendants in said action, plaintiffs in error, could be taken without just compensation, and in deciding that the said proceedings and the said several decisions made by the said court as herein-

1272 before set forth, did not deprive the defendants in said action, plaintiffs in error, of their property without due process of law, and did not deny to them the equal protection of the laws, and did not impair the obligations of the contract made by said Spanish

and Mexican grants and United States patents, and the said grantees and patentees therein, and their successors in estate.

XIX*a*.

The said court erred in deciding that the said tract of land of 314.82 acres of land sought to be condemned in said action could be taken by the payment by the city of Los Angeles of the sum of $23,000, in that the said sum was not the fair value of the said land, and is not just compensation therefor; but on the contrary the said land is and was of the value of more than one million dollars, and that the said sum was ascertained and determined under the instructions of the superior court of the county of Los Angeles whereby all value of the said lands accruing to it by reason of the right to the use of the waters thereon for agricultural and domestic purposes, and the value of the said waters percolating in the said soil were taken away from the consideration of the jury, and they were, under the directions of the court affirmed by the supreme court of the State of California, required to confine their estimate to the value of the land at the date of the issuance of the summons, stripped of all rights to the waters of the Los Angeles river, or the said percolating waters; and it did appear in the said case that the total amount of the water in the Los Angeles river flowing through said tract of land did not exceed 2,300 inches, measured under a four-inch pressure, all of which could be consumed in supplying the inhabitants of the city and the municipal corporation itself with water for their uses, and although there were arising in the said river below the lands of the defendants and flowing in the said Los Angeles river an amount of at least 2,000 inches, measured under a four-inch pressure, over and above that flowing in the said stream on the lands of the said defendants.

1273 XIX*b*.

The court erred in deciding that the whole basin of the San Fernando valley was the bed of the Los Angeles river, and that the said city of Los Angeles was the owner of and entitled to the exclusive right to develop the said percolating waters therein, and take the same for its own use and that defendants had no rights therein.

1274 XX.

At the trial of this cause, the superior court of the county of Los Angeles gave to the jury, among other instructions the following:

"The only question you are to decide is the amount of compensation which the defendants are entitled to before their estate and interest in the land can be taken as proposed.

This compensation is to be composed of two parts or elements; first, the value of the interest and estate of the defendants in the land described in the complaint; second, the amount of the damages which will accrue to the other land of the defendants which is a part of the same parcel as the land to be taken, by reason of the

severance of the land to be condemned, and the construction of the works thereon as proposed by the plaintiff. For the purpose of assessing this compensation and damages the right is deemed to have accrued at the date of the summons, which is June 27 1893, and the actual value at that date is the measure of value for all property taken and the basis of damages for all property injuriously affected.

The defendants' estate in the lands in controversy is an estate in fee-simple, but it is subject to the right of the city of Los Angeles in the waters of the Los Angeles river. This river flows through the land to be condemned. If the city of Los Angeles had no interest in the river waters, then the defendants would have all the rights of riparian proprietors in those waters. As it is, their rights as riparian proprietors are impaired and diminished to the extent that the rights of the city effect those rights.

The city of Los Angeles is situated on the river below these lands and is the owner of the right to take from the Los Angeles river all the water that is reasonably necessary to give an ample sup-
1275 ply for the use of its inhabitants and for all municipal uses and purposes for which the city may require water. This right is measured by the necessity and if the needs increase in the future, the right will expand to include all that the needs require. This right of the city is paramount and superior to the rights of the defendants in the waters of the river.

The defendants, therefore, have no right to so use or divert the water of the river as to diminish the same so that it will not furnish the amount needed for the supply of the city aforesaid and in determining the value of the land to be taken, this fact must be considered and the value of the land for which defendants are entitled to compensation is its value subject to the above-stated right of the city."

At the trial of the cause, it was admitted that the territorial limits of the city of Los Angeles extended vastly beyond the patent limits and that said additional territory incorporated within the city contained a large number of inhabitants, and that within a few years before the trial, and long after the title of the defendants to the lands in question had vested, the city had established public parks in three of which lakes were maintained, and the water for filling the same was obtained from the Los Angeles river, and that said lakes were maintained and boats were kept and run thereon for the pleasure of the people, and that lawns, trees and flowers of various kinds were cultivated and irrigated from the waters of the said river.

The said instructions, and each of them, were affirmed by the supreme court of the State of California, and the defendants aver that the said supreme court of the State of California erred in deciding that the said instructions were proper and in deciding that the rights of these defendants to the use of the waters of the Los Angeles river upon their said lands were subordinate to the paramount right of the city of L. A. for supplying its inhabit-

ants living outside of the said limits of land patented
1276 by the United States to the city of Los Angeles, and were subordinate to the paramount rights of the city of Los Angeles to take and appropriate the waters of the said Los Angeles river for the purposes aforesaid, and that this paramount right of the city of L. A. was measured by the necessity, and that if the needs of the said city should increase in the future, the right would expand to include all of the needs required, and that this right of the city was paramount and superior to the rights of the defendants in the waters of the river, and that the rights of the defendants as riparian proprietors were impaired and diminished to the extent that the rights of the city, as thus defined and declared, affected those rights, and that the defendants had no right to use or divert the water of the river so as to diminish the same to such an extent that it would not furnish the amount needed for the supply of the said city of Los Angeles, as therein asserted. And in deciding that this fact—that is, the subordination of the rights of the defendants to these superior and paramount rights of the city—should be considered, and the value of the land for which defendants were entitled to compensation was its value subject to the above-stated rights of the city, and by the said decision of the said supreme court of California, the property of these defendants was taken without due process of law, and the said instructions and decision of the supreme court affirming the same did impair the obligations of the contract contained in the grant of the said lands by the Spanish and Mexican government, to the defendants, and did deprive them of their property without due process of law, in violation of the Constitution of the United States.

And the defendants, plaintiffs in error, further here state that at the said trial, it was shown, and in the record in this case, it
1277 does appear, that these defendants own the said lands in fee-simple, and that their title is derived from grants made by the Spanish government of the San Rafael rancho in the year 1784, and the grant by the Mexican government of the Providencia rancho in 1843, and a grant by the Mexican government of a tract called Cahuenga in 1843, all of which said grants were presented to the board of land commissioners for the settlement of private land claims in California, and were by them confirmed, and patents therefor issued from the United States; and that the said grants were anterior to the grant by the Mexican government to the town or pueblo of Los Angeles of the said lands, amounting to four square leagues, confirmed by the board of land commissioners, and patented by the United States. And that the said tract of land herein condemned was situated within the said three ranchos, and made up of parts of each of the said grants, and the Los Angeles river flowed in its natural channel through the said lands and the tract in each of said ranchos, and that they were situated on the Los Angeles river above the city of Los Angeles.

## XXI.

The superior court of the county of Los Angeles also instructed the said jury as follows:

"After the wants of the city are supplied, however, the defendants have the right to use the water of the river on their lands for any and every purpose which does not interfere with the equal rights or injure the lands of other riparian proprietors along the river, above and below this land. These rights include a reasonable use of water of the river on the land for irrigation and domestic purposes, watering stock or other lawful purposes, also to obtain power by means of the fall of the stream on the land returning the water to the stream before it leaves the land; also the benefit of having the water flow in its accustomed manner through the land."

Which said instruction was also approved and affirmed by the supreme court of the State of California. And the defendants
1278 say that the said supreme court erred in deciding that the said instruction was correct in this, that all of the rights which were there alleged to pertain to the defendants as riparian owners were stated to exist only after the wants of the city, as defined and explained by the previous instructions, were supplied.

## XXII.

The said superior court also instructed the jury as follows:

"Rights in a subterranean water-course or stream are governed by the same rules as a surface stream of water, and the only rights that the defendants as owners of the land sought to be condemned would have in any subterranean water-course flowing through their lands, down to and through the lands of others, (whether said stream flowed on the said lower lands above the surface or beneath the surface of the ground) would be to make the same, but no other use, that they would be entitled to make had such waters flowed on the surface."

Which instruction was also approved and affirmed by the supreme court of California and the defendants assign the said decision as error in that it made the use of such subterranean streams subordinate to the alleged paramount rights of the city of Los Angeles as in the said instructions defined.

## XXIII.

The said superior court also instructed the jury as follows:

"A riparian proprietor is not entitled to divert (for any purpose except for purposes for which he is entitled to make use of on his riparian lands as specified in these instructions,) any portion of the waters of a water-course, or stream, whether surface or subterranean; and he cannot by any indirect means make such diversion
1279 where he would not have been authorized to do so directly.

Therefore, a riparian proprietor cannot by sinking tunnels, or making other excavations, under the sides or underneath the bed of such water-course draw away for use on non-riparian lands any of the waters flowing in such water-course, although said exca-

vations may not directly touch said stream; if, for instance, the water of such stream percolates into the banks or bed thereof to a considerable but limited distance, and such percolating water is stationary, or has very little motion, said riparian proprietor would have no right to make an excavation so as to draw off said percolating water, if the effect would be to cause any of the running waters of said stream to leave the same in order to fill up the voids left in the banks or bed from which said percolating waters were drawn by such excavation, any more than if said excavation was made so as to tap said stream directly.

The mere fact that some of the subterranean water forming part of the stream on the lands sought to be condemned may be lost before reaching the point where the same would have gone into and made up part of the surface or subter-anean stream of the Los Angeles river, would not give the defendants the right to divert an amount of said waters in said lands equal to or less than the amount so lost, if such diversion would have the effect of diminishing the waters surface or subterranean of the said river at any point above the south line of the pueblo lands of the city of Los Angeles.

Whatever additional market value the land may have had by reason of these rights and advantages, so far as they do not interfere with or impair the rights of the city aforesaid, this value the defendants are entitled to as a part of the value of the land, before it can be taken; and this value you must include in your estimate of the value of the land sought to be condemned."

Which instructions were approved and affirmed by the
1280 supreme court, and the said supreme court erred in deciding that said instructions were proper, in that they denied the plaintiffs have the right to compensation for the subterranean percolating waters, although they might be lost before reaching the point where they would have gone into and made up a part of the surface or subterranean stream of the Los Angeles river, and the defendants would not be entitled to divert any such water so lost or any amount equal to that lost, if such diversion would have the effect of diminishing the waters, surface or subterranean of the said river, at any point above the south line of the pueblo lands of the city of Los Angeles. And in deciding that the defendants were only entitled to the additional market value of the land — might have by reason of the rights and advantages therein mentioned, so far only as they did not interfere with or impair the rights of the city, as those rights had been therein determined.

## XXIV.

The said superior court of the county of Los Angeles also instructed the jury as follows:

"In addition to these rights and benefits arising from the flow of the river through this land, the defendants are the absolute owners of all such water as may be presented in the soil of this land and which does not constitute a part of the water of the river. This is usually called percolating water. There is, how-

ever, no magic in the word 'percolating,' and the fact that any witness may apply that word or refuse to apply it to any particular class of waters of which he may speak is not conclusive of the question whether or not such water does or does not form part of the river. That question is to be determined by you from a consideration of the facts proven. The right and ownership of the defendants in this class of waters is distinct from and much greater than their right to the waters of the stream. As to the waters of the stream they have a right only to the use of it on
1281 this land, and they do not own its corpus, or its body or the very water itself and they have no right to take it away from the land and use it on other lands, or to sell or dispose of it for use on other lands or at other places. But as to this other water, if any there be in this land, not a part of the stream, they are the absolute owners of it, to the same extent and as fully as they own the soil, or the rocks or timber on the land. Therefore, if, by any means, they can separate this water from the land, they have an absolute right to the water thus separated and may conduct it away and sell or dispose of it anywhere as they see fit, subject only to the limitation that they may not excavate or do anything on the land for the mere purpose of intercepting such water and preventing it from flowing into the stream or water-course on the land of another and without intending to make any beneficial use of it themselves. Whatever additional market value this land may have had by reason of the presence therein of water of this class, or by reason of the feasibility of separating it from the land, or of using it on the land, or of conducting it to some other place for use or sale, or of the great market value of such water for such purposes, or by reason of all these things combined, or by reason of any other lawful benefit or advantage which this water gives, this additional market value inures to the benefit of the defendants and is a part of the compensation to which they are entitled in this case as the value of the land to be condemned.

The Los Angeles river is composed of its main stream and any branches it may have, whether surface or subterranean.

While a water-course must have a bed and banks or sides, yet such bed may consist of any material which keeps the waters from penetrating below a certain depth, and such banks or sides may consist of any material which has the effect of confining the waters within circumscribed limits.

It does not always follow that water which does not flow
1282 on the surface in a visible stream is for that reason not a water-course, or not a part of the water of a stream which does at some place run on the surface; nor need it flow in a defined channel under ground as a solid body of moving water of any particular dimensions in order to constitute a water-course.

If you find from the evidence that there is a bed or river bottom filled to a considerable depth with sand, gravel or other porous material, meandering over which a stream runs on the surface and through and in which the water moves under ground, enough of it rising to the surface to supply the surface stream, and the other por-

tions of the underground water moving with a much less velocity than the surface stream, and through a wider or larger space in and through the interstices of the porous material, but in the same general direction as the surface stream and in connection with it, and in a course and within a space reasonably well defined, the condition being such that the existence and general direction of the body of water moving under ground can be determined with reasonable accuracy, then that portion of the water thus moving under ground should be considered as a part of the water-course as well as that part which flows over the surface.

If such water-course exists, it is immaterial so far as the water-course is concerned from or through what lands the water flows in reaching the channel or whether they reach the same by percolation or by clearly defined streams.

If the jury find that on the lands sought to be condemned there is situated the river bottom of the Los Angeles river extending the whole length of said land, and occupying nearly the whole thereof, and containing all of the subterranean waters of said land, and filled to a considerable depth with permeable material consisting of loam, sand, gravel and boulders mixed together and interspersed with irregular and broken strata, masses or pockets of clay, and cemented sand or gravel, lying in place sub-
1283 stantially as deposited by the forces of nature, and that as the same lies in place the natural voi-s or interstices of such material generally thoughout the whole of said river bottom are equal to from one-fifth to one-third of the entire mass; and that the subterranean waters in said lands enter the same chiefly from the north and partly from the west sides thereof from lands composed of substantially the same materials as the lands sought to be condemned, said waters so entering under pressure caused by gravity; and that the south boundary of said river bottom is formed of an impenetrable dyke of rock known as the Cahuenga hills; and said waters entering from said north side are prevented from continuing their flow to the south, and are dam*n*ed up by said wall of rock, and that all of the subterranean waters in said river bottom are thereby forced to fill all of the said interstices and void places in the material of which said river bottom is composed to a height in some places equal to and in some places greater than the level of the surface stream of the river; and that there are no impenetrable and continuous barriers extending through the said mass in said river bottom in any direction so as to interrupt and prevent the substantial continuity and contact of all of said subterranean waters; and that some of the said subterranean waters to the amount of about 1,000 miners' inches constant flow, measured under a four-inch pressure, being so brought to the surface, enter into and form part of the surface stream of the Los Angeles river on said lands, so that the amount of said surface flow at the point where the same leaves said land on the east is increased by about 1,000 inches over the amount of its surface flow at the point where it enters said land on the west; and that the remainder of said subterranean waters move under ground to the east although with a varying velocity and much

slower than the said surface stream but in the same general direction with it, off of the lands sought to be condemned and still continuing in and through the river bottom of
1284 the Los Angeles river, which is composed of like permeable material as aforesaid, and bounded and confined on the southerly, as it turns to the south, on the westerly side thereof by the same continuous dyke of rock; said waters still maintaing their substantial continuity; and that part of said waters rise from time to time as they flow in said river bottom and feed the surface flow of said river; and the remainder of said waters, continue to move under ground in said river bottom as aforesaid; and that said waters continue to move in that manner for several miles after leaving the lands sought to be condemned, and until said river bottom enters within the limits of the city of Los Angeles, crossing its northern boundary; then the jury must find that all of the subterranean waters contained in the land sought to be condemned are a part of the waters of the Los Angeles river.

If you find from the evidence that the lands sought to be condemned are situated at the lower portion of and form a part of the San Fernando basin, or watershed, near or at its outlet, and that said basin is about 24 miles long and about 12 miles wide at the widest point, and that said outlet is from two thousand feet to three miles wide, and bounded and defined on the southern side by the rock of the Cahuenga range and on its northern side by similar rock of the Verdugo hills, and that the earth of which the basin is generally composed, including said outlet and the land sought to be condemned, is an alluvial or other deposit made up of loam, sand, gravel and boulders mixed together and interspersed with broken or irregular strata or masses of clay or cemented sand and gravel and lying in place as originally deposited by the forces of nature, and that as the same lies in place, the natural voids or interstices of such earth, generally throughout the basin, including the defendants' lands and said outlet, are equal to from one-fifth to one-third of the bulk of the entire mass, and that such entire deposit lies upon a grade or slope toward and through
1285 the outlet of such basin, and that all the water falling in the watershed of said basin, which is not lost in storm run-off or by evaporation or in supporting plant life, or held immovable in the ground, sinks into the earth composing such basin and thence by force of gravity moves down through such voids or natural interstices of the earth throughout the greater portion of the entire mass to the outlet of the basin, through which it passes without forming anywhere in the mass any definite course or channel in which it can be ascertained with reasonable accuracy that such water is moving in greater quantities or with greater velocity than in other places, so as to be concentrated in a stream either above or below ground, then such waters so moving through such outlet, or through or in defendants' land in the natural voids or interstices of the earth, do not constitute a subterranean flowing stream or water-course, but they belong to the owners of the soil in which they may be found and the portion of them which may be found in the lands of the de-

fendants are the property of the defendants. But if such water does collect under ground and flow in certain courses or channels through coarse, permeable material therein, where the existence and general course of the flowing or moving body of water can be easily determined, then the water so moving in such channels would constitute a water-course, although not visible on the surface and although the space through which the channel extends may be largely filled with the material through which the water flows.

The burden of proving that waters moving in the ground are flowing in a natural water-course or in a defined channel or are a part of a stream, is upon the plaintiff in this action. The presumption is that they are not part of a stream or water-course nor flowing in a definite channel."

Upon the trial of the cause it was testified and conceded that at
1286 the point where the tract sought to be condemned is situated, the valley between the two ranges of mountains is nowhere less than two miles in width.

The said instructions under the evidence thus given were approved and affirmed by the supreme court of the State of California, and the defendants allege that the said decision of the supreme court of California approving and affirming the said instructions was error, and that the descriptions there given of the subterranean waters showed as a matter of law that they were percolating waters and not an underground water-course, and that the said instructions and the said decision of the supreme court did in effect state to the jury that the defendants were not the owners of the percolating waters in the soil, and were not entitled to compensation for the value of the said lands by reason of the presence of the said waters, and that such decision was in violation of the Constitution of the United States, and did deprive these defendants of their property without just compensation, and without due process of law.

XXV.

At the trial of this cause, testimony was given in substance and effect as follows:

That at the date of the issuance of summons there was little or no knowledge of the existence of these underground waters in the said lands, and that the market value thereof at that time was not affected by reason of the underground waters whether percolating or otherwise, because the public generally had no knowledge of their existence, nor did any one have the information then that was possessed by the parties at the time of the trial, and in this state of the evidence, the court gave to the jury the following instructions:

"The market value of the land is not necessarily the value of the
1287 land in its present or prospective use to the owners; nor is it the value which it would be to the city as a location for headworks; nor the sum which the city must be compelled to give for it by reason of the necessity it may be under to obtain it; nor is it the sum that could be derived from the land for any special purpose for which it may be suitable. All these things, if shown by the evidence, may be considered as bearing on the question, but

only so far as it may appear that they affect the actual market value at the date of the summons, and the thing you are to determine is such actual market value at the date stated.

Although you may believe from the evidence that by reason of things done, discovered or ascertained since June 27, 1893, it now appears that the land was then more valuable for any purpose or use than it was then known to be; yet you cannot consider such additional value unless you believe also that these things were sufficiently known or obvious in June, 1893, to affect the market value at that time, and did so affect it.

If the jury find that any of the underground waters of the lands sought to be condemned are not a part of the waters of the Los Angeles river, they can consider that fact in fixing compensation only so far as it tended, if at all, to affect the actual market value of the land at the date of issuing the summons disregarding any acts done upon the lands or information acquired concerning said waters since said date.

You are entitled to consider the evidence regarding the quantity of subterranean waters in the lands in question, and their value, only in arriving at a just determination of the market value of the lands sought to be condemned on the 27th day of June, 1893, wherefore, if you believe that said waters did not give said lands an additional market value at that date, or that if an additional market value were given but the same did not equal the real value of said waters, then you must place on said lands a valuation equal only to the market value which they then had, including such addi-
1288 tional market value which said waters gave to said lands, irrespective of the true value of said waters.

If, for instance, said lands could not have been sold in the market on said date (the owners having had abundant time to find a purchaser, such as would generally be taken by an owner trying to sell like property), for more than a certain sum, then you must not find the value of said lands to be greater than said sum, although in fact you may believe that the waters in said lands made them worth more than that sum."

Which said instructions were approved and affirmed by the supreme court of the State of California, and the defendants allege that the supreme court of the State of California erred in so deciding, and that such decision denied the rights of the defendants' just compensation, or the actual value of their said property, and made the measure of compensation depend upon the knowledge of the public generally, at the date of the issuance of the summons the test or measure of compensation, and that such decision and the said instructions were based upon the provisions of section 1249 of the Code of Civil Procedure of the State of California, which is as follows:

"For the purpose of assessing compensation and damages, the right thereto shall be deemed to have accrued at the date of the summons, and its actual value at that date shall be the measure of compensation for all property to be actually taken, and the basis of damages to property not actually taken, but injuriously affected in

all cases where such damages are alleged, as provided in section 1248. If an order be made letting the plaintiff into possession, as provided in section 1254, the compensation and damages awarded shall draw lawful interest from the date of such order. No improvements put upon the property subsequent to the date of the service of the summons shall be included in the assessment of compensation or damages."

1289 And defendants claim and allege that the said statute of the State of California as thus interpreted by the supreme court of the State of California, is in violation of the Constitution of the United States, and is void, and that said decision did deprive the defendants of their property without due process of law, and did take their said property without making just compensation.

XXVI.

By the record aforesaid, it appears that the judgment of the said supreme court aforesaid was given for the defendant in error against the plaintiffs in error and did affirm the judgment of the said superior court of the county of Los Angeles and the various rulings and decisions made therein and hereinbefore set forth, whereas by the law of the land the said judgment of the said supreme court of the State of California ought to have reversed the judgment of the said superior court of the county of Los Angeles, and the said decision ought to have been against the validity of the said statutes of the State of California, and of the authority exercised under the said statutes for the condemnation of the said property. And that said statutes were repugnant to the Constitution of the United States and void. And the said supreme court ought to have decided that said instructions so given by the said superior court were contrary to law and did deprive these defendants of their property without due process of law, and without making just compensation, and did take their said property without making just compensation, and did deny to the plaintiffs in error the equal protection of the laws. And the said judgment of the said supreme court ought to have reversed the said judgment of the superior court of the county of Los Angeles, and the said plaintiffs in error pray that the judgment and decision of the supreme court may be reversed, annulled and altogether held for nought and that the said court be directed to reverse the judgment of the superior court of the county of Los Angeles, State of California, and that the said plaintiffs in error may have

1290 such other relief as they may be entitled to.

R. H. F. VARIEL,
JOHN G. NORTH, AND
J. S. CHAPMAN,
*Attorneys for Defendants, John D. Hooker and A. E. Pomeroy, Plaintiffs in Error.*

JOHN GARBER, *Of Counsel.*

1291 [Endorsed:] L. A. No. 419. In the supreme court of the State of California. City of Los Angeles, plaintiff, *vs.* John D.

Hooker and A. E. Pomeroy, defendants. Order allowing writ of error. Filed, June 27th, 1901. Geo. W. Root, clerk. By A. W. Johnson, deputy. J. S. Chapman, att'y-at-law, 100–'3 Potomac block, Los Angeles, Cal.

1292 In the Supreme Court of the State of California.

CITY OF LOS ANGELES, Plaintiff,
*vs.*
JOHN D. HOOKER and A. E. POMEROY, Defendants.

*Order Allowing Writ of Error.*

Upon motion of R. H. F. Variel, John G. North, John S. Chapman, John Garber, attorneys for the defendants, John D. Hooker and A. E. Pomeroy, and upon filing a petition for a writ of error and an assignment of errors,

It is ordered that a writ of error be and hereby is allowed to have reviewed in the United States Supreme Court the judgment heretofore entered herein, and that the amount of bond on said writ of error be and hereby is fixed at $5,000.

Dated this 24th day of June, 1901.

W. H. BEATTY,
*Chief Justice of the Supreme Court.*

1293 [Endorsed:] No. L. A. 419. In the supreme court of the State of California. City of Los Angeles, plaintiff and defendant in error, *vs.* John D. Hooker and A. E. Pomeroy, defendants and plaintiffs in error. Certificate. Filed Jul- 9 1901 Geo. W. Root, clerk. By Geo. H. Ryan deputy.

1294 In the Supreme Court of the State of California.

CITY OF LOS ANGELES, Plaintiff and Defendant in Error,
*vs.*
JOHN D. HOOKER and A. E. POMEROY, Defendants and Plaintiffs in Error.
L. A., No. 419.

It is hereby certified that this cause was ordered to be and was heard and determined in bank and was not allotted to or heard or decided in either of the departments of said court and that the court in bank, on the 3rd day of June, 1899, decided said cause and rendered judgment affirming the judgment and order appealed from; that thereafter and within the time prescribed by the rules of said court, to wit, within twenty days after the filing of said judgment, the said defendants filed in said court their petition presented to said court for a rehearing in said cause and said petition was considered and acted upon by the said supreme court of the State of California, and on the 3rd day of July, 1899, the said petition for a rehearing was by said court denied, and thereupon said judgment became final and a remittitur was issued thereon. The rules and

practice of said court, during all the times aforesaid, provided and required that where cases are heard and determined in bank without being allotted to or heard or determined in department, the remittitur should issue thirty days after the final judgment and that either party might petition the court for a rehearing at any time within twenty days after such filing.

Wherefore, this certificate is ordered to be made part of the record and to be attested with the seal of said court.

[Seal Supreme Court of California.]

W. H. BEATTY,
*Chief Justice of the State of California.*

1295 [Endorsed:] Copy L. A. 419 In the supreme court of the State of California. City of Los Angeles, plaintiff, *vs.* John D. Hooker and A. E. Pomeroy, defendants. Copy Order for bond. Filed June 27, 1901 Geo. W. Root clerk A. W. Johnson chief deputy. Garber, Creswell & Garber, attorneys-at-law, 305 Sansome street, San Francisco, Cal.

1296 Copy.

In the Supreme Court of the State of California.

CITY OF LOS ANGELES, Plaintiff and Defendant in Error,
*vs.*
JOHN D. HOOKER and A. E. POMEROY, Defendants and Plaintiffs in Error.

*Order Fixing Bond on Application for a Writ of Error.*

The defendants having this day filed their petition for a writ of error from the decision and judgment thereon made and entered herein to the Supreme Court of the United States, together with an assignment of errors, within due time, and also praying that an order be made fixing the amount of security which the defendants should give and furnish upon the said writ of error, and said petition having this day been duly allowed,

Now therefore it is ordered that the bond to be given by said defendants John D. Hooker and A. E. Pomeroy upon said writ of error and the amount thereof is hereby fixed at the sum of five thousand dollars, and that said plaintiffs in error shall file with the clerk of said court a good and sufficient bond in the sum of five thousand dollars to the effect that if the said defendants and plaintiffs in error shall prosecute the said writ of error to effect and answer all damages and costs if they fail to make their plea good, then the said obligation to be void; otherwise to remain in full force and effect. The said bond to be approved by this court.

Dated this 27 day of June.

W. H. BEATTY,
*Chief Justice of the Supreme Court of the State of California.*

1297 [Endorsed:] L. A. No. 419. In the supreme court of the State of California. City of Los Angeles, plaintiff, vs. John D. Hooker and A. E. Pomeroy, defendants. Bond on application for a writ of error. Filed June 27, 1901. Geo. W. Root, clerk. By A. W. Johnson, deputy. J. S. Chapman, att'y-at-law, rooms 100–3 Potomac block, Los Angeles, Cal.

1298 (50-ct. int. rev. st.)

Know all men by these presents: That we, John D. Hooker and A. E. Pomeroy, as principals, and H. R. Boynton and Fred L. Baker as sureties, are held and firmly bound unto the City of Los Angeles, a municipal corporation organized under the laws of the State of California, in the full and just sum of $5,000 to be paid to the said City of Los Angeles, its certain attorneys or assigns, to which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators, jointly and severally firmly by these presents.

Sealed with our seals and dated this 25th day of June in the year of our Lord one thousand nine hundred and one.

Whereas, lately at a session of the supreme court of the State of California in a suit pending in said court between The City of Los Angeles, plaintiff and John D. Hooker and A. E. Pomeroy, defendants, a final judgment was rendered against the said defendants; and the said John D. Hooker and A. E. Pomeroy, defendants, having obtained from said court a writ of error to reverse the judgment in the aforesaid suit, and a citation directed to the said City of Los Angeles is about to be issued citing and admonishing it to be and appear at the Supreme Court of the United States to be holden at Washington in the District of Columbia.

Now the condition of the above obligation is such that if the said John D. Hooker and A. E. Pomeroy shall prosecute their writ of error to effect and shall answer all damages and costs that may be awarded against them, if they fail to make their plea good, then the above obligation to be void, otherwise to remain in full force and virtue.

JOHN D. HOOKER. [SEAL.]
A. E. POMEROY. [SEAL.]
H. R. BOYNTON. [SEAL.]
FRED L. BAKER. [SEAL.]

1299 STATE OF CALIFORNIA, } ss:
*County of Los Angeles,* }

H. R. Boynton and Fred L. Baker, the persons named in and who subscribed the foregoing bond as the sureties thereto, being severally duly sworn, each for himself, says: That he is worth the amount specified in the said undertaking as the penalty thereof, to wit: five thousand dollars, over and above all of his just debts and liabilities, exclusive of property exempt from execution, and that he is a resident and freeholder within the State of California.

H. R. BOYNTON.
FRED L. BAKER.

(10-ct. rev. st.)

Subscribed and sworn to before me, this 25th day of June, 1901.

WARD CHAPMAN,
*Notary Public in and for the County of Los Angeles, State of California.*

The foregoing and within bond is hereby approved June 27th, 1901.

W. H. BEATTY,
*Chief Justice of the Supreme Court of the State of California.*

1300 [Endorsed:] Original L. A. 419 United States of America In the supreme court of the State of California. City of Los Angeles *vs.* John D. Hooker *et al.* Citation. Filed Jun- 27 1901 Geo. W. Root, clerk. By W. E. Boody, deputy. Garber, Creswell & Garber, attorneys-at-law, 305 Sansome street, San Francisco, Cal.

1301 UNITED STATES OF AMERICA, *ss:*

CITY OF LOS ANGELES, Defendant in Error,
*vs.*
JOHN D. HOOKER and A. E. POMEROY, Plaintiffs in Error.

To the City of Los Angeles, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States to be held at the city of Washington in the District of Columbia, on Monday, August 26th, A. D. 1901, pursuant to a writ of error filed in the clerk's office of the supreme court of the State of California, wherein John D. Hooker and A. E. Pomeroy are defendants and plaintiffs in error, and you are plaintiff and defendant in error, to show cause, if any there be, why judgment in the said writ of error mentioned should not be corrected, and speedy justice should not be done to the parties in that behalf.

Witness the Honorable W. H. Beatty chief justice of the supreme court of the State of California, this 27th day of June, A. D. 1901, and of the Independence of the United States the one hundred and —sixth.

W. H. BEATTY,
*Chief Justice of the Supreme Court of the State of California.*

Due service of the within citation and receipt of a copy of the writ of error mentioned therein this day admitted and copy of the same served upon us. Los Angeles, Cal. the 29th day of June, 1901; without waiver of any objections whatever, and especially reserving right to object that writ of error and citation were not taken or issued in time.

W. E. DUNN,
W. B. MATHEWS,
LEE & SCOTT,
*Att'ys for City of Los Angeles, Def't in Error.*

1302 In the Supreme Court of the State of California.

I, George W. Root, clerk of the supreme court of the State of California, do hereby certify that the preceding and annexed is a true and correct copy of the following enumerated documents in Los Angeles, number 419, City of Los Angeles *vs.* Pomeroy, *et al.*, as shown by the records of my office.

Volume I.

| | |
|---|---|
| Original writ of error, | pages 1 to 2 inclusive. |
| Index to transcript and exhibits, | " *a* to *x* inclusive. |
| Transcript, | " 1 to 300 inclusive. |

Volume II.

| | |
|---|---|
| Transcript, | " 301 to 630 inclusive. |

Volume III.

| | |
|---|---|
| Transcript, | " 631 to 960 inclusive. |

Volume IV.

| | |
|---|---|
| Transcript, | " 961 to 1081 inclusive. |
| Photographs, of exhibits per page *x* of index of transcript. | |
| Opinion, | pages 1 to 15. |
| Petition for rehearing, | " 1 to 98 inclusive. |
| Minute order, | " 1. |
| Judgment, | " 1. |
| Petition for writ of error, | " 1 to 35. |
| Assignment of errors, | " 1 to 24. |
| Order allowing writ, | " 1. |
| Certificate of chief justice, | " 1. |
| Order for bond, | " 1. |
| Bond on writ of error, | " 2. |
| Original citation, | " 1. |

Witness my hand and the seal of the court, this 25th day of July, A. D. 1901.

[Seal Supreme Court of California.]

GEO. W. ROOT, *Clerk*,
By W. E. BOODY, *Deputy*.

Endorsed on cover: File No. 18243. California supreme court. Term No. 390. John D. Hooker and A. E. Pomeroy, plaintiffs in error, *vs.* The City of Los Angeles. Filed August 8, 1901.

# IN THE SUPREME COURT OF THE UNITED STATES.

A. E. POMEROY and JOHN D. HOOKER, Plaintiffs in Error,
*vs.*
THE CITY OF LOS ANGELES, Defendant in Error.
} Stipulation.

Whereas in the record in this cause now on file in the clerk's office of the Supreme Court of the United States there are a large number of photographs which were introduced at the trial of the cause as part of the evidence therein, and whereas it is unnecessary that a copy thereof should be bound in or annexed to the printed transcripts, but the said photographs on file are sufficient for all purposes:

Now therefore it is stipulated by the parties hereto that the said photographs need not be duplicated, or copies thereof multiplied or placed in the record, or attached thereto, but that the said parties, or either of them may so far as at all necessary for any purpose herein refer to the photographs now on file in said court; without waiver of defendant's right to move to dismiss for reasons other than matters herein referred to.

J. S. CHAPMAN,
*Attorney for Plaintiffs in Error.*
W. E. DUNN,
LEE & SCOTT,
W. B. MATHEWS,
ALBERT CRUTCHER,
*Attorneys for Defendant in Error.*

[Endorsed:] No. 390 Supreme Court United States A. E. Pomeroy *et al.* pl'tif- in error *v.* City of Los Angeles def't in error Stipulation with reference to photos. in record— J. S. Chapman, attorney-at-law rooms 100–'3 Potomac block, Los Angeles, California.

[Endorsed:] File No. 18,243 Supreme Court U. S. October term, 1901 Term No. 390 John D. Hooker *et al.*, pl'ffs in error *vs.* The City of Los Angeles Stipulation to omit photographs from printed record, &c. Filed Nov. 7, 1901.